MINING CONGRESS JOURNAL

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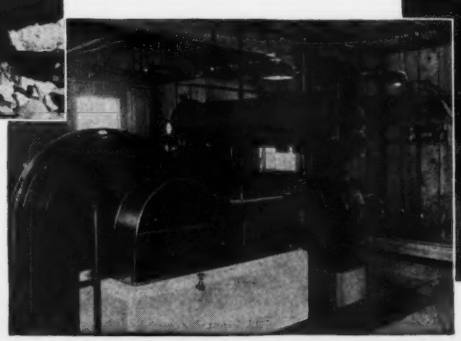

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Truck Type Machine—Pat. and Pats. Pending—also licensed under the patents of E. C. Morgan. Patent numbers 1,706,961—1,706,962—1,707,143—1,707,133—1,953,325—1,953,326.

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Jeffrey equipment is backed by years of engineering experience . . . is designed on lines sufficiently rugged to stand up in day-after-day service. Wherever there are mines you will find Jeffrey equipment doing an outstanding job . . . piling up those performance records which have always followed Jeffrey mining machinery. The Jeffrey Mfg. Co., Columbus, Ohio.

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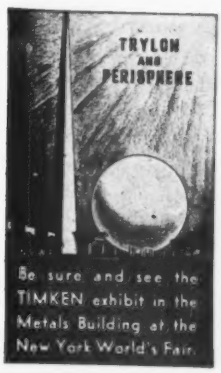

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Explosives Department **Wilmington, Delaware**

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rpm synchronous motor driving Jeffrey 13-foot Aerodyne fan at Olga Mine No. 2 of the Carter Coal Co., Coalwood, West Virginia

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CARTER COAL REDUCES POWER COSTS WITH A G-E SYNCHRONOUS MOTOR ON A NEW 13-FOOT FAN

PROVIDING VENTILATION FOR GREATER SAFETY IN THE MINE

Exterior view of fan installation at Olga Mine No. 2. The fan is capable of delivering 600,000 cubic feet of air per minute against a 6-inch water gage

A G-E synchronous motor on the new 13-foot ventilating fan at the Olga No. 2 Mine of the Carter Coal Company, Coalwood, West Virginia, has raised the power-factor at the company's mines from 95 per cent to 100 per cent. Because there is a power-factor-improvement clause in the power contract, it is estimated that the motor will pay for itself in reduced power costs by the end of 2½ years.

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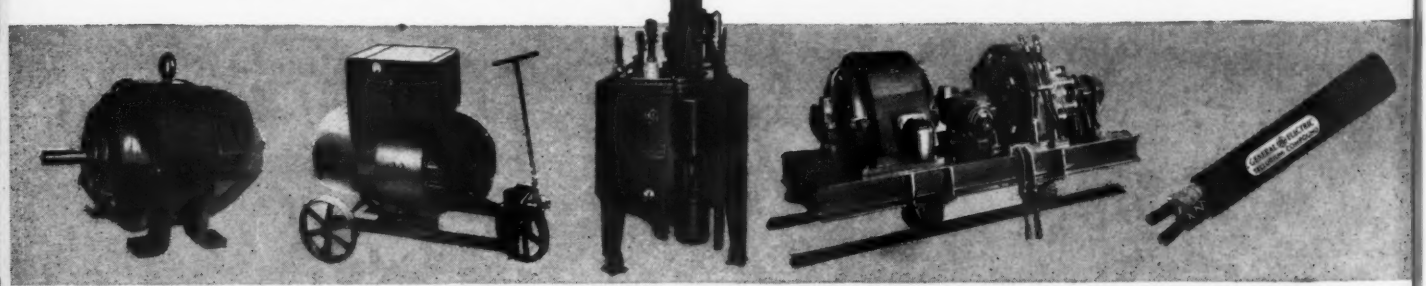

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GENERAL ELECTRIC

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Permissibles for Rock Work or Producing Fine Coal: Two Hercules permissibles were especially designed for this type of work; namely, Red H B, L.F. and Collier C, L.F. In tight places, the higher cartridge strength of Red H B, L.F. may be desirable, while in easier shooting it is sometimes more economical to use the higher count Collier C, L.F.

Red H B, L.F. 280*	Collier C, L.F. 320*

*Cartridge counts refer to the approximate number of 1¼-in. × 8-in. cartridges in 100 lb. of explosives.

Gelatin Permissibles for Wet Work or Rock Work: Hercogel A offers the highest water resistance available in permissible explosives. For most water conditions, however, Hercogel 2, a semi-gelatin permissible, should prove satisfactory, and where it can be used it will be found much more economical. In some rock work a gelatin or semi-gelatin permissible is desirable because of high cartridge strength and rate of detonation. Gelatin permissibles are not as economical to use as ammonia permissibles.

Hercogel A 206*	Hercogel 2 .....240*

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"D"— Bulky and fast (250*)
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"B" Blasting Powder: Granulations (coarse to fine): Standard 1 or 3C, Standard 2 or 2C, Standard 3 or C, Standard 4 or F, Standard 5 or 2F, Standard 6 or 3F, Standard 7 or 4F. Packing: 25-lb. kegs.

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CONTENTS

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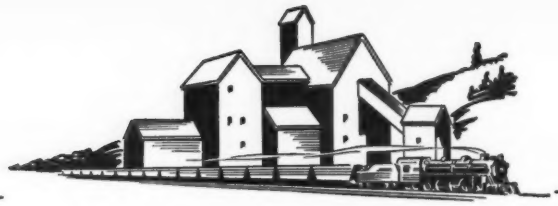

A Star in the East

BUSINESS will be greatly heartened by the first sign of economy that has been exhibited in national affairs since the beginning of the great depression of 1929.

A reduction of one hundred and fifty million dollars in the relief appropriation asked by the President gives assurance that Congress has again assumed its responsibility and will not again surrender its right to determine how much of and how the taxpayers' money shall be spent. It is assurance that one hundred and fifty million dollars more will be available for business enterprise and the legitimate employment of labor.

Business will hope that this is but the beginning of an era of common sense as applied to management of public affairs—and of more careful discrimination in fixing the duties of the Federal government and the extent to which many activities now paid for by the Federal Treasury should either be discontinued entirely or should be turned back to the local agencies which formerly assumed responsibility therefor.

Congress should provide for a commission to determine the duties and responsibilities of the Federal government and the duties and responsibilities of the several states. Such commission might well undertake to determine the total amount which government should cost and the amount which business can pay for government without too far destroying its ability to employ labor.

It is obvious that if all of the earnings of business were exacted in taxes, its ability to function and to employ labor would be ended. Furthermore, it is quite apparent that the amount now required has so crippled business enterprise as to prevent its proper operation and its employment of the labor now on relief rolls, and that instead of moving forward industry is moving backward.

In most of the discussions of the ability of industry to pay taxes it is assumed that the earnings of business are entirely in money and available for the payment of taxes. The fallacy of this viewpoint is readily apparent.

Although money derived from business earnings can be and is used over and over again, this function, while general, is very much limited as applied to the individual. The stream of money, like the water in the river, passes through the stages of evaporation, cloud formation and downfall, and may be a long time getting back to its spender.

And thus the saving of one hundred and fifty millions by the act of Congress, and the many implications and assurance of its act will be accepted by industry as a star of promise.

A JOURNAL FOR THE ENTIRE MINING INDUSTRY—PUBLISHED BY THE AMERICAN MINING CONGRESS

MINING CONGRESS JOURNAL

Vol. 25 FEBRUARY, 1939 No. 2

Richard J. Lund, Editor

BUDGETARY CONTROL

IN recent years witnesses appearing before the Committees on Ways and Means and Finance of the National Congress have in the course of their presentations been frequently met with this statement from a chairman or member of the Committee: "After all, this Committee is confronted with the necessity of raising additional revenues. We have nothing to do with appropriations. You tell us how to raise the money."

These Committeemen are right—they are making a perfectly true statement. Theirs is the duty to raise revenue—they have nothing to do with the outgo.

In a clear realization of this situation the membership of the American Mining Congress in annual meeting in Washington on January 27, 1939, declared:

"Congressional responsibility for expenditures should be united with congressional responsibility for revenues. We urge that each House of Congress create a Committee on the Budget, the membership of which will include members responsible for appropriations and members responsible for taxation. The annual executive budget, containing estimated revenue yields and the proposed expenditures for the year, should be referred to this Committee. After appropriate Committee consideration and full debate, each House of Congress should then determine and fix the maximum amount of expenditures for the year, and require that the separate appropriation bills, as well as legislation authorizing appropriations, conform to this determination, and the aggregate be kept within this maximum amount. With a ceiling thus placed upon expenditures, an effective control by Congress over both taxation and appropriations can be restored and maintained."

Men of proven ability in revenue matters tell us that we cannot with any assurance expect to secure revenues in excess of $6,500,000,000 annually, and there is at present no indication that the repeated national deficit of more than $2,500,000,000 per year will cease. There is no tenable revenue-taking method which will produce seven, eight or nine billions of dollars annually.

Unfortunately it is not generally realized that there is no procedure under which the House of Representatives or the Senate consider the aggregate total of expenditures before an appropriation committee undertakes the allotment of federal money. The consideration of federal expenditures is a piece-meal procedure. In many States the budgetary control is far better than that exercised by the federal government. In urging that Committees on the Budget be created in each of the Houses of Congress, the American Mining Congress has in mind that their consideration of the budget and action by the Congress on their reports shall follow immediately upon receipt of the President's budget messages. The Committees should in the main consider totals, and the Appropriations Committees thereafter should not exceed these totals as previously agreed upon by Congress. Thus self-control could be exercised as in the case of a family budget, a corporation budget, or a State budget.

With such a ceiling established, any proposed appropriation in excess of the agreed total would be subject to a point of order on the floor of either House of Congress, and hence could be readily checked. Careful and considered thought shows that by the above program a sound fiscal status is not an impossibility. The job is before us—the budget should and can be balanced at an early date.

TAXING THE MACHINE

Introduction of a bill by a member of the West Virginia legislature to tax mechanically loaded coal 25 cents per ton serves as striking evidence of some of the short-sighted fallacious thought prevailing in certain quarters with regard to coal's salvation.

Presumably this is done with the hope that somehow such a tax might react to the benefit of labor. But anyone with an ounce of "gray matter" can readily see that opposite effects would be felt at once through operation of such a measure. Costs must be lowered, not raised, in order to improve the industry's status against the inroads of competitive fuels and thereby to better the position of coal mining labor.

A measure such as this appeals only to the uninformed who are casting about in the dark for ways to help the employment situation, and will certainly not receive the sympathy of persons with any judgment whatsoever—be they representatives of management, of labor, or of government.

MINING IN 1938

Review and Forecast

METAL MINING TECHNOLOGY*

● ***Evolution of Improved Metal Mining Methods and Equipment Continues Unabated***

By CHAS. F. JACKSON
Chief Engineer, Mining Division
Bureau of Mines

IN discussing progress in mining technology it must be recognized that advances in practice seldom occur suddenly—usually they are evolved. Evolution may be very gradual or fairly rapid, and the rate of development may depend to a considerable extent upon the economic exigencies of the times and changes in natural conditions. It is therefore difficult to refer a new technologic development to a specific year. The following is a continuation of a similar article in the February 1938, issue, of the MINING CONGRESS JOURNAL and is intended to call attention in a brief review to significant current developments in metal-mining technology.

General Conditions

At the beginning of the year activity in metal mining (except gold) was declining, and by late spring productive operations were greatly curtailed; some mines had suspended production entirely, although a number of the larger, well-financed development projects continued unabated. Productive activity was renewed after the middle of the year; operations were expanded at many mines and were resumed at others that had closed temporarily. Toward the end of the year the upward curve had flattened, and again some suspensions of operations were noted.

Although the causes of these fluctuations are economic, they have an effect upon mining technology, which must be geared to meet them with minimum loss.

Gold Mining

Some gold mines that had been operating during recent years under the stimulus of $35 gold were closed owing to depletion of ore reserves; others, both lode and placer, came into production, with the net result that gold production in 1938 slightly exceeded that of 1937, in spite of the fact that production was considerably reduced at base-metal mines producing important quantities of gold as a by-product.

The advances in adapting dragline and power-shovel equipment to placer mining and in perfecting operating technique continued to result in new productive placer-mining enterprises where available yardage is insufficient for, or operating conditions are unsuited to, the use of connected-bucket dredges. Dragline plants have proved to be adapted to working certain deposits in Alaska, and numerous new installations were made there, in California, Colorado, Idaho, Montana, and other Western States.

A number of new bucket dredges started operation and others were under construction at the year end. One of the new dredges is designed to dig 115 feet below water line against a 40-foot bank, and is to be equipped with 18 cubic-foot buckets. Further use of jigs is noted in the gold-saving circuits of both bucket and dragline plants.

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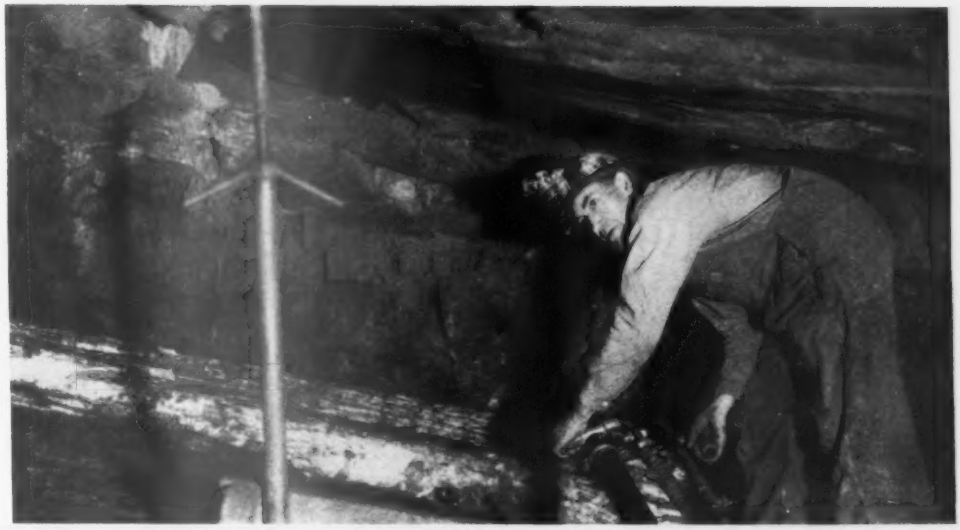


Mining a thin gold vein by "resuing" or stripping

Exploration

The increased use of diamond drilling for exploration and sampling in the Western States, noted a year ago, continued during 1938, and many small mines are now employing diamond drills for routine exploratory work. The availability during the last year or two of preset bort bits of both the "cast-set" and Koebel types probably has contributed considerably to this end. These bits can be bought when and in the quantity required for the work in hand, and it is not necessary to carry a large inventory or to employ an expert setter; this is particularly advantageous where only a small amount of drilling is done, or drilling operations are sporadic. Some contractors and larger operators have also found it economical to use these bits.

Portable violet-ray lamps are being employed more and more in exploring for fluorescent minerals, notably scheelite.

Mine Tunnels

A number of long mine tunnels were started, were being driven, or were completed in 1938. For the most part, modern, fast-driving methods were employed, using mechanical loading. The 7,000-foot vehicular tunnel in Bingham Canyon was holed through on February 21; several months were then devoted to concreting and installation of an automatic ventilation system, and the tunnel was expected to be opened to vehicular traffic January 1, 1939.

Shafts

Sinking was under way at many mines either to provide initial or new operating shafts, or for ventilation purposes. The new circular shaft at the Zenith mine, Ely, Minn., is in the latter category. It was begun in April and completed to a depth of 1,208 feet in October. It is 5½ feet in diameter and is the second shaft to be sunk by the shot-drill method developed at the Idaho-Maryland mine in California. More powerful and rugged equipment than that employed at Idaho-Maryland was designed and installed before operations were begun. The drilling of large-diameter, shot-drill holes between levels for ventilation has become a more or less routine operation at the United Verde mine in Arizona and at the Butte, Mont., mines.[1] The equipment, manufactured by Ingersoll-Rand, differs from that used at Idaho-Maryland and Zenith principally in that the cutting shoe is attached to a string of drill-rods rotated by mechanism at the collar of the hole.

Scene at typical small gold mine

Dragline equipment for small gold dredging operations is finding increasing favor

[1] Tierney, Michael P., The Calyx Core Drill: Mining Congress Journal, Nov., 1938, pp. 14-21.

Mining Methods

The use of scraper-transfer drifts for gathering broken ore from stopes and for loading cars on the haulage level is increasing. This practice, inaugurated in 1928 at the Montreal mine in Wisconsin, was later employed at other Michigan iron mines, at Flin Flon, Manitoba, and at Climax, Colo. A scraper-drift system was being installed at Cananea when visited by the writer in January, 1938, and at the end of the year the branch raise system was being replaced by transfer drifts at Consolidated Copper Mines. At Cananea the system is used in conjunction with a variation of shrinkage stoping, locally referred to euphoniously as the "belly shrink." A boundary shrinkage stope is carried around all four sides of an undercut block about 100 x 100 to 150 feet. The physical character of the ore is such that the boundary stope can be kept ahead of the central part of the stope, the back of which bellies downward, and with some assistance from long holes drilled in from the boundary stopes, the belly sloughs off as the stope advances upward. The Holden mine (Chelan range, Washington) is employing a large-scale "Retreating shrinkage and bulldozing chamber" system,[2] similar to that developed at the Britannia mine.[3]

Mining Equipment

An enumeration of all the new and improved mining equipment introduced by various manufacturers during the past year would be voluminous, and only a few items are mentioned which seem to indicate significant trends. The use of automatic-feed drills, especially in development work, increased during 1938, and in this connection at least one new pneumatic-feed and two chain-feed drifters were placed on the market. One manufacturer introduced a self-supporting stoper designed to facilitate starting the holes and to minimize hazards incident to breaking of the drill steel while drilling.

Reference to increased mechanization underground has become almost a habit with the present writer, but since this is a significant development, continued progress during 1938 must be mentioned—especially the increased use of direct-loading, dipper-type machines in driving small headings and for mucking after blasting down drift backs in preparation for stoping. One new machine of this type was brought out in 1938. Three-drum scraper hoists are finding wider application.

Stripping overburden preparatory to dredging with dragline

In surface mining, additional use of tractors and bulldozers for clean-up work and grading and of large trucks for haulage is noted. At the Judd mine [4] a combined truck and conveyor transport system started operation late in 1937 and was tuned up and ready for the 1938 season.

Of interest to mine operators in remote, mountainous country are tractors being developed by the United States Forestry Service, one with 26-inch treads for use on rough trails, which has negotiated grades up to 35 percent, and a "snow" caterpillar that will work in deep snow over unbroken trails, hauling loads of 3 to 7 tons at speeds of 3 to 25 miles per hour. A 43-yard truck was designed and built in California.

Air-Conditioning

Several valuable articles on air-conditioning of mines in the United States appeared recently.[5] Air cooling is a primary objective at both Butte and Magma, but due to differences in the controlling conditions, the methods employed are basically different. In contrast to these installations it is interesting to note that at the Morris mine in Minnesota the intake air is heated to prevent ice formation in the shaft.[6] Four steam unit heaters, automatically controlled by thermostats in the shaft, are employed to maintain intake air at just above freezing temperature.

Unwatering Operations

During the year news items have repeatedly called attention to dewatering operations, indicating the reopening of an unusual number of old mines for examination or for production. One of the largest of these operations was that at the Isle Royale mine in Michigan.[7] Modern power and pumping equipment, including standard mine pumps, sinking pumps, deep-well pumps, and efficient air compressors used in conjunction with air-lift equipment, have greatly facilitated and cheapened the cost of unwatering mines.

Mine Debris

Legislation, proposed or already enacted, with a view to control of stream pollution from mining operations is of increasing concern to the western mining industry. In this connection it is suggested that engineering principles promptly applied to the problem of waste disposal at each individual mine can avert, at relatively small expense, sweeping legislation that otherwise may interfere seriously with mining operations. During the year a number of companies completed construction of impounding reservoirs, and in California one or more large debris dams were under construction by the end of the year for impounding placer tailings.

[2] Huttl, J. B., Howe Sound's Holden Mine Nears Production: Eng. & Min. Jour., Jan., 1938, pp. 32-35.

[3] Brennan, C. V., Mining Operations at the Property of the Britannia Mining & Smelting Co., Ltd., Britannia Beach, British Columbia. Bureau of Mines Inf. Circ. 6815, 1935, 36 pp

[4] Remer, Charles H., Judd Pit on Western Mesabi Exhibits Current Trends: Eng. & Min. Jour., March, 1938, pp. 38-39.

[5] Richardson, A. S., Air Conditioning for Ventilation of Butte Mines: Min. Cong. Jour., Oct., 1937, pp. 43-45; Eng. & Min. Jour., Oct., 1938, pp. 29-35.

Foracker, C. B., Ventilation and Air Conditioning of the Magma Mine: Min. Cong. Jour., Nov., 1937, pp. 22-23; Am. Inst. Min. & Met. Eng., Tech. Pub. 979, 15 pp.

Kooistra, J. F., Remarks on Air Conditioning for Mines: Min. Cong. Jour., Nov., 1937, pp. 23-26.

[6] Skillings Mining Review, Dec. 3, 1938.

[7] Eaton, Lucien, Reopening and Rehabilitation of the Isle Royale Copper Mine: Mining Congress Journal, Oct., 1938, pp. 39-43.

Present Economic Status and Business Outlook for Lake Superior Iron Ore Industry*

Iron ore on its way to the blast furnace. Use of trucks in strip operations is expanding rapidly

By HERBERT C. JACKSON
Pickands, Mather & Co.

● ***Based on Comparison of Present Recession With That of 1920-22, Shipments in 1939 Of 40-45 Million Tons Forecast***

THE Lake Superior district, consisting of northern Minnesota, Wisconsin and Michigan, produces and ships about 85 percent of the iron ore consumed in the United States. In a normal year this district should ship 50,000,000 tons of iron ore and employ 20,000 men. In 1937 the shipment was 63,000,000 tons. These total shipments are transported by railroads to Lake Superior and upper Lake Michigan ports where they are transshipped via bulk freight vessels in 10,000-ton cargoes to lower lake ports for consumption by the iron and steel industry in the district bounded roughly by the Great Lakes on the north, the Appalachian Mountains on the east, the Ohio River on the south and the Mississippi River on the west. Prior to about 1916 the industry considered a large part of the eastern seaboard and considerable territory south of the Ohio as its market but the local tax-spending bodies in Minnesota raised tax costs so high that the competing eastern, foreign and southern ores captured these markets.

Production Curtailment Lags Behind Consumption Drop

In view of the necessity of shipping this iron ore during navigation season of the Great Lakes, a full year's requirements for the iron and steel business must be moved in a six months' period. Ore commitments are usually made in March and April, and on the basis of the orders then received, the mines set up their production schedules. After the mines start shipping, it is difficult and uneconomic to curtail these production schedules. Consequently in periods of business recession it is characteristic that decline in iron ore production lags behind the decline in manufacture and distribution.

This principle is well illustrated by the cycle which began in August, 1937. The slump in the iron and steel industry, beginning in mid-summer of 1937 when the steel industry was operating at 85 percent of capacity, became a rout as the rate of production slid to 40 percent and then 30 percent in October and November. This disastrous landslide in the steel industry did not materially affect iron ore shipments which held up well in the months of August to November to finish the year 1937 with over 63,000,000 tons shipped, the fourth largest in the industry's history.

The record shipment of iron ore during 1937 and the drastic curtailment of consumption by the iron and steel industry which continued up to the opening of the 1938 season of navigation, resulted in an overstock of iron ore on lower lake docks and in furnace yards. Such stocks amounted to 34,000,000 tons on May 1, 1938, or about 15,000,000 tons over the predepression normal.

Excess stocks of ore at the opening of navigation in 1938, prospects for continuing low consumption during the summer (less than 2,000,000 tons per month compared to more than 5,000,000 tons per month the year before) and a natural tendency to reduce excess inventory, is the explanation for the relatively light movement of 19,500,000 tons of ore during 1938. The present slow acceleration in the consumption of ore which began in August, if continued through the

* Presented to Metal Mining Convention of the American Mining Congress, Western Division, Los Angeles, Calif., October 26, 1938. Revised by the author to include 1938 figures.

winter, will reduce stocks on dock and at furnaces to more nearly normal proportions by the opening of lake navigation in 1939.

Outlook for 1939

This brings us to an appraisal of the near future for the Lake Superior iron ore industry. Much has happened during the past several months to industry in general and to the steel industry in particular, which raises all sorts of questions as to the future of the steel and its tributary industries.

The Federal Government has placed on business regulatory legislation creating a fundamentally different condition than any time in the past. These artificial handicaps have tended toward retarding business. On the other hand, the Federal Government has entered into a tremendous spending campaign which has the tendency, temporarily at least, to stimulate business and may offset to a considerable degree the artificial regulatory handicaps. To the extent that the uneconomic opposing forces so injected in business by the Government offset each other, the temporary net effect on the business outlook, while disturbing to business sentiment, may not greatly alter near-term normal business trends. This temporary result is entirely aside from the permanent long-range result on the economies of the nation if the general spending spree is long continued. For the short term outlook, it is possible that business will not be much different than it would have been if permitted to follow its normal course.

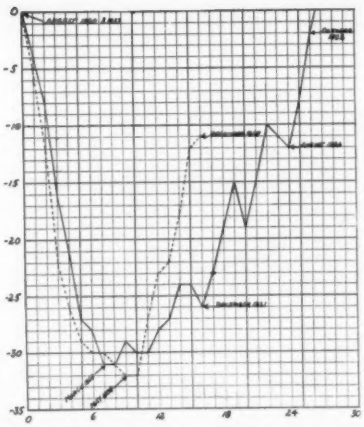
Result of Basing Point Changes Too Recent to Appraise

In addition to the troubles of general business, the iron and steel industry is now undergoing serious internal disturbances precipitated by the elimination of the major price-basing points which had been traditional with the industry. The present establishment of as many price-basing points as there are important consuming centers and the significant price reductions reflect the intense competition in the industry. The result of this on the steel industry is too recent to appraise.

Present Recession Compared with That of 1920-22

Disregarding the effect on the iron ore business of the present uncertainties in the steel industry caused by base price changes, it may be important to note that the present secondary business reaction and the short post-war depression of 1920-22 have traveled very similar paths as shown by the accompanying chart. Contrary to the general impression that our present recession started with a much more sudden drop in business activity than any previous depression, it will be noted that the initial drop both in the 1920-22 depression and the present recession lasted approximately seven to 10 months and that the fall in business activity during such period was approximately the same in each case. The graph shows a comparison of the business activity indices for the period from August, 1920, to November, 1922, and from August, 1937, up to the present writing, which is December, 1938. From this chart it will be noted that the 1921 depression struck bottom in about seven months and that the present recession was approximately at bottom in seven months but went a little lower in the succeeding two months, and then the business activity started to climb slightly more rapidly than in the 1920-22 period.

It will be noted from the graph that our present recovery has been much steadier than in 1921 and with every month showing greater business activity than the preceding month, compared to several minor setbacks in the 1921-22 recovery. This suggests that in our present recovery during the early part of 1939 we may look for temporary intermediate declines. However, if the ultimate recovery may be expected to follow the same general trend as the 1922 recovery, we can expect the return by industry in general to 1937 levels of production by December, 1939. Aside from the usual uncertainties attendant on any business forecast, we must always have in the back of our minds the possibility of a general war in Europe during 1939. The probable effect of such a catastrophe would be an immediate precipitate drop in business activity in this country which would temporarily interrupt the course which the recovery would otherwise take. This might well delay the cycle of return to 1937 conditions from the end of 1939 to sometime in 1940. In our opinion about eight months after war would start in Europe—regardless of our possible participation—business activity would be at a higher rate in this country than it would be in the hoped event that there is no war.



Business activity chart. Solid line shows activity from August, 1920, to November, 1922; the dotted line from August, 1937, to December, 1938. Business activity indices of August, 1920, and August, 1937, used as starting point and shown on chart as zero. Points by which business activity declined shown vertically and duration in months horizontally

A striking similarity also exists between these two periods with respect to the Lake Superior iron ore shipments, inventories, and consumption. We find that these are practically the

	1920 Tons	1937 Tons
Shipments	60,417,000	63,186,000
Ore in stockpiles at lower lake docks and furnaces (May 1)	18,153,000	14,632,000
Ore consumed	57,154,000	53,996,000
Average	45,241,000	43,938,000
	1921 Tons	**1938 Tons**
Shipments	22,799,000	19,563,000
Ore in stockpiles at lower lake docks and furnaces (May 1)	27,595,000	33,676,000
Ore consumed	25,832,000	25,711,000
Average	25,409,000	26,317,000
	1922 Tons	**1939* Tons**
Shipments	43,992,000	45,000,000
Ore in stockpiles at lower lake docks and furnaces (May 1)	25,092,000	21,500,000
Ore consumed	40,976,000	40,000,000
Average	36,687,000	35,500,000

* Estimate based on 1922.

same for the years 1920 and 1937, as well as for the years 1921 and 1938, which would lead us to believe that the year 1939 might be similar to the year 1922. In 1922 approximately 44,000,000 tons of iron ore were shipped from the Lake Superior district.

The comparative figures of ore production, inventory at lower lakes available at the beginning of the lake shipping period, and the consumption of Lake Superior iron ores during the years 1920-22, inclusive, are shown in the accompanying comparison with those for 1937 and 1938 and as estimated for 1939.

If the present increasing trend in iron ore consumption continues, we will come up to May 1, 1939, with little more than normal inventories of iron ore at lower lakes and a consumption at that time by the iron and steel industry which will predict the need of approximately 3,500,000 tons per month for the ensuing 12 months. As it is customary to cover these requirements by shipments during the ensuing six months, a total shipment of 40 to 45 million tons in 1939 would be predicted.

The Local Tax Problem

In conclusion, just a word to give some idea of a special major problem in the Lake Superior iron ore district—that of burdensome local taxes. The tribute paid in taxes to the localities where the ore is produced amounts to over $1 per ton of iron and steel produced from the ore mined. It is 50 percent more than the labor cost of mining the ore and represents about 25 percent of the gross value of the ore. The mining industry as a whole in the United States pays about 2.3 percent of the gross value of its product for state and local taxes, or less than one-tenth the relative tax burden paid by Lake Superior district iron ore.

The result of this exorbitant taxation forces the uneconomic mining of the highest-grade (and highest-profit) ores, leaving the low-grade ores which should be mined with the high-grade, if this were economically possible. Also, the increase in costs caused by high taxes restricts our normal market area, thus curtailing production. It is only fair to say that the present unwise taxation tactics are being realized by some of those in authority, and it is hoped that a saner and more prudent taxing policy may be established for the mutual benefit of all concerned. Any prediction of the long-term development of this industry is impossible until some satisfactory solution is found for this tax situation.

REVIEW and OUTLOOK for COPPER*

● ***Relations Between Productive Capacity, Consumption and Price Changes Analyzed***

By KENNETH C. BROWNELL
Vice President and Sales Manager
American Smelting and Refining Co.

DURING the last year the world has been working and living in a state of considerable excitement. The international situation has undoubtedly been more tense and more uncertain than at any time since the end of the World War. This uncertainty, naturally, has been reflected in the state of the copper market. All those who read this paper would, of course, be very much interested if some indication could be furnished as to the probable future course of the copper market, both as to volume and as to price. With one very good sized war in progress in the Orient, with another smaller, though very active war continuing at a merry pace in the Spanish Peninsula, and with war clouds having only recently lifted, for an indeterminate time, from all of Europe, he who dares to prophesy the future of copper for the coming few months must consider himself fortunate if his prophecy is not proven completely erroneous.

Irrespective of today's unstable condition of the world, there are several factors relating to the copper market which may well be borne in mind whenever one tries to form his own judgment as to the future of copper. I propose to deal briefly with a few of these, and thereafter to give a short outline of the trend of copper during the last few months.

Heavy World Consumption for War Purposes

Factor number one: A considerable proportion of the world's output of copper today is being consumed for war purposes. This is obvious, but it seems worth while to point out that with a change in the international situation, the consumption of copper for strictly war uses may also change quite sharply and quite suddenly. It is impossible to determine exactly what percentage of foreign copper goes for ammunition or other war purposes, but undoubtedly the tonnage involved is quite a respectable one. Consumption within the United States, is, of course, much less affected by this war consumption factor.

In view of Mr. Chamberlain's statement to the House of Commons that England's rearmament program will be continued at an unabated pace, one may assume that buying of copper for war preparation will not appreciably diminish in the immediate future. If, however, peace should by any chance become established on a world-wide scale, the present foreign demand for copper would probably be considerably reduced for a period of months, although in the long run, actual consumption of copper under peace conditions is almost sure to be greater in volume than consumption under present uncertain conditions, even including buying due to preparation for war.

Interdependence of Domestic and Foreign Prices

A second factor which should be borne in mind is that the domestic and foreign prices for copper are interdependent one upon the other, in spite of the tariff of 4 cents per pound now

* Presented to Metal Mining Convention of the American Mining Congress, Western Division, Los Angeles, Calif., October 26, 1938. Revised by the author to bring data up to date.

in force upon importation of foreign copper into the United States market. Leaving out the period from April 1934 to June 1935, when the domestic price of copper was fixed under the N. R. A. code then in force, it is interesting to note that from July 1932 through December 1938, the European price for copper delivered C. I. F. usual European ports was higher than the domestic copper delivered Connecticut Valley points during 20 months, while the domestic price was higher than the European price during 43 months. The monthly average quotations of the *Engineering and Mining Journal* were used for the purpose of this comparison.

The difference between the two markets is usually no greater than would result from day-to-day fluctuations, bearing in mind that the foreign price very seldom remains unchanged for more than a day or two at a time, while changes in the domestic price occur much less frequently. It is interesting to note from this comparison of prices that in 41 out of the 63 months under review, the difference between the two markets was less than 3/10ths of 1 cent per pound; in 54 out of the 63 months, the difference amounted to less than ½ cent per pound. A few of the many reasons for this uniformity in price between the two markets are the following:

(1) When the foreign price is above domestic parity, domestic consumers naturally become encouraged and are apt to enter the market as substantial buyers, thereby tending to strengthen the domestic price; conversely, when the domestic price is higher than the foreign price, domestic consumers tend to defer their purchases as much as possible.

(2) Month in and month out, a considerable volume of domestic duty-free copper flows abroad and is consumed in the foreign market. Over the last few years exports of such copper from the United States have run between 5,000 and 10,000 tons monthly. During 1937 it is estimated that about 65,000 to 70,000 tons of duty-free copper went abroad, the monthly rate being somewhat under 6,000 tons. The volume for 1936 was approximately the same as in 1937, but in 1935 statistics indicate that average monthly exports of duty-free electrolytic copper amounted to approximately 8,000 tons a month, and in 1934 to about 11,000 tons per month. For the year 1938 such exports were running at the rate of about 10,000 tons per month. To these figures must be added the copper content of exports of secondary copper, normally amounting to 2,000 or 2,500 tons per month. As a general statement, therefore, one might say that average exports of strictly domestic copper vary between 7,500 tons and 12,500 tons monthly, but fluctuations from one month to another are quite substantial. For example, during 1938 exports in one month declined to approximately 7,000 tons, yet during the latter part of the year were probably running at a rate of above 16,000 tons.

When the foreign price is above the domestic parity, the flow of duty-free copper abroad very promptly increases, thus lessening the supply of copper available within the United States, and tending to increase the domestic price, at the same time increasing the supply of copper available in the European market, and thereby tending to reduce that price. When the domestic price remains above foreign parity, exportation of duty-free copper slows down, thus increasing the domestic supply and diminishing the foreign supply and tending to bring the two markets together.

The flow of domestic copper abroad, therefore, tends to act as a balance wheel, the influence of which under all conditions is to keep the domestic price and the foreign price more or less at the same level.

It is impossible adequately to cover all of the reasons for the uniformity of price between the domestic and foreign markets in the short scope of the present article; for our purposes it is sufficient to say that historically the two markets have remained very close together for some years, and there is no reason to expect any change in this relationship, so far as one can see at the present time. The conclusion to be drawn is that in considering movements in price, copper should be regarded as a world-wide commodity; developments in the foreign field must be assumed to have just as much weight as purely domestic developments.

(3) A third factor to be borne in mind is that a change in volume of consumption of copper does not *necessarily* mean a great change in the price of copper. At certain times a small change in volume of consumption may bring about a great change in price; at other times consumption may increase or decrease to a considerable degree with a relatively stable price level. In short, changes in volume of consumption cannot be correlated definitely with changes in price, and any consideration of the copper market should take this lack of correlation into account.

The huge open pit of United Verde at Jerome, Ariz., is a spectacular sight

Productive Capacity Much Greater Than Normal Consumption

The fundamental reason for the fact that a considerable change in volume of consumption does not necessarily bring about a great change in price, seems to be that the capacity to produce copper throughout the world is considerably greater than normal consumption, and is more or less equal to peak periods of consumption, occurring usually at the top of cyclical movements in general business. In the United States, for example, Dr. Ingalls, in his paper presented to the American Mining Congress in 1936, estimated our producing capacity at about 1,000,000 tons per annum. Consumption of copper in the United States probably exceeded this figure in 1929, but thereafter declined steadily to its lowest point in 1932, when consumption was around 350,000 tons of copper. Beginning with the year 1933 consumption began to show a steady improvement which lasted for five

years, but in 1937, which we can classify as a very satisfactory year, total consumption of duty-free copper, including tonnage sold for export, was probably between 850,000 and 900,000 tons, or still below productive capacity; as a matter of fact, for a good part of that year productive capacity was used to its fullest extent, but peak consumption did not last long enough to justify the mines in maintaining peak output for the entire year.

In the foreign market, which, as explained above, has a large influence upon the domestic market, production during 1937, according to the American Bureau of Metal Statistics, amounted to 1,666,000 tons—the highest figure ever recorded. This must be fairly close to the productive capacity of foreign copper, although during the last month of the year the Association of Foreign Copper Producers limited their output to below actual productive capacity. It seems safe to assume that in spite of a consumption of foreign copper during 1937 far above any tonnage ever thought possible in prior years, productive capacity still was ahead of actual consumption.

In a period of rising volume of business, as consumption of copper increases, producers usually increase their rate of output with the purpose of putting themselves in a position of meeting the demand, and, of course, reaping the reward of a reduced cost of production. It is also usually true that copper producers enter a period of rising business with fairly heavy stocks of copper accumulated during the prior depression, and these stocks are liquidated as demand increases.

Consumption, Productive Capacity, and Price

Once consumption becomes nearly equal to productive capacity, a very small increase in demand for copper tends to produce a very marked increase in price. This situation prevailed during the early months of 1937 when the price of copper was forced up from 12 cents per pound at the beginning of January to 17 cents as of March 31—a rise of 5 cents without any material increase in actual rate of consumption. The price held at 17 cents for only a few days, and by April 30 had declined to 14 cents. This very rapid rise was contrary to the wishes of some of the larger producers, but because effective demand, enhanced by a wave of commodity speculation originating in London and thereafter sweeping the United States, was equal to or greater than supply, they were helpless to prevent what amounted to a run-away market.

A further example of the lack of correlation between rate of consumption and price is shown by the fact that in 1935 consumption of U. S. duty-free copper was estimated at slightly below 600,000 tons, as compared with a 1936 consumption of over 800,000 tons, yet the average Engineering and Mining Journal price in 1935 was 8.65 cents per pound, and in 1936 only 9.47 cents per pound; consumption, therefore, increased 33 1/3 percent between these two years, while the average price increased 0.82 cents per pound, or 9½ percent.

In the foreign market, during the first eight months of 1937 deliveries to consumers as reported by the Copper Institute amounted to 888,000 tons, and the average price of foreign copper for that period was 14.42 cents. During the first eight months of 1938 deliveries of foreign copper amounted to 957,000 tons, yet the average price for the latter period was 9.38 cents per pound, or 5.04 cents below the prior year. We have in this instance a case where consumption increased by 7½ percent and the average price actually declined by 35 percent.

Consumption Volume Not Definite Index of Price Trend

These figures show that in judging the future trend of the copper market, the volume of consumption cannot be used as a definite index of the trend of price. In general, an increased volume of consumption means an increased price, and vice versa, but the amount of change in consumption seems to have little connection with the amount of change in price.

Recent Trend in Copper Market

Let us now turn to an examination of the position of the copper market during the last few months. The following points seem worthy of mention:

(1) As already stated, consumption of copper in the foreign market remains at an astonishingly high level of 120,000 to 125,000 tons per month. Unless the international situation changes, we may anticipate that this consumption will be maintained over the coming few months.

(2) The foreign copper market during the last several months has been taking 15,000 to 16,000 tons per month of domestic duty-free copper.

(3) Consumption of copper in the United States seems to have reached a low point in April 1938, and to have increased steadily until November. United States consumption probably fell to a figure of around 35,000 tons per month in the late spring; by August this figure had increased to over 50,000 tons per month. The upward trend continued, and in October consumption was approximately 65,000 to 70,000 tons. In November consumption fell to approximately the level prevailing in September, i.e., about 52,500 tons per month. December showed a further falling off to a level of approximately 40,000 tons, but December consumption is always affected by the usual year-end inventory date, so that the actual flow of copper into consumption during December probably was considerably greater than the statistics indicate. These figures are not to be taken as anything more than approximations, since it is almost impossible to arrive at definite figures for the passage of copper through the many steps from mine to refiner, to fabricator, and then on to the ultimate consumer. We may safely conclude, however, that United States consumption of copper showed a sharply rising tendency from the late spring of 1938 through the month of October, with a minor recession in the last two months of the year.

(4) Production of copper has also risen markedly. Mine or smelter production, plus custom intake of copper, as reported by the Copper Institute, was 58,760 tons in January of 1938. A steady decline took place until July, when production was at the low level of 31,155 tons. During the last five months of the year a substantial increase in output occurred. In November 72,963 tons were produced, an increase of approximately 235 percent since July. December output of 71,795 tons was approximately unchanged from November. Production, therefore, decreased steadily from January to July and increased practically steadily from July through December.

(5) Stocks of refined copper showed a steady decrease during the last half of 1938. At the first of the year total refined stocks as reported by the Copper Institute stood at 259,351 tons. Stocks increased steadily throughout the early part of the year, reaching a peak on

May 31 of 369,809 tons. During the first five months of the year, therefore, total refined stocks increased by approximately 110,000 tons. Thereafter a marked decline in total stocks took place, and on October 1 stocks were reduced to 267,299 tons, an average decrease from the end of May of 20,500 tons monthly. Stocks were approximately unchanged at the end of November, but rose slightly more than 20,000 tons during December. An important factor in this rise undoubtedly was the usual taking of inventory by fabricators as of the end of the year.

(6) It is interesting to note that the low point in consumption of both domestic lead and domestic zinc was also reached in the late spring of 1938, and thereafter consumption in each of these metals increased at approximately the same rate as is indicated above for copper. In domestic lead, for example, the low point of shipments occurred in April, and in the case of zinc, April also showed the lowest volume of shipments.

(7) The price of domestic copper on January 1 of last year was 10⅛ cents delivered Conecticut Valley. A rally occurred during the early part of January which lifted the price to a high of 10⅞ cents, but thereafter the price fell until the 9 cents level was reached on May 19. This proved to be the bottom of the declining phase of the market; thereafter prices showed a steadily advancing tendency, and on January 1, 1939, the domestic price was 11¼ cents delivered Connecticut Valley.

(8) We may therefore conclude that the bottom of 1937-1938 business recession, so far as the copper industry is concerned, was reached in the late spring of 1938, and that since then the copper market, both with regard to volume of consumption and with regard to price, showed a steadily advancing trend until the last month of the year. As pointed out above, foreign consumption of copper remains at a very high level, with no indication of any marked decrease in the near future. Domestic consumption evidently remains at a satisfactory level, although undoubtedly below the peak month of October 1938. It is to be hoped that the advancing trend shown during most of the last half of 1938 will be resumed in 1939, and that the copper industry will look forward to a much better year this year than last.

The CURRENT OUTLOOK for LEAD*

● ***Actions of New Foreign Producers Association Expected to Have Beneficial Effect. Industry Held to Be in Sound Position***

By STANLY A. EASTON
President
Bunker Hill & Sullivan
Mining & Concentrating Co.

I THINK it will be appropriate to review lead conditions for the last few years before dealing specifically with the current outlook.

Disregarding the 1929 conditions, in 1930 the American lead production continued at a high rate. Producers were very slow to realize there had been a rather definite and a drastic change in conditions. Seemingly they could not believe the intense industrial activity of the late twenties would not return in the near future. As a result, they were reluctant to curtail production. Stocks increased rapidly. Soon they became unwieldy, at one time having been substantially higher than 300,000 tons.

Having become accustomed to a price of 6 cents, 7 cents, 8 cents, and 9 cents a pound, they felt that the 1930 average of 5½ cents in New York was a very conservative price.

In 1931 production declined almost 30 percent and the prices for that year declined about 25 percent. It was at a 4¼-cent level. But it was not until the following year, 1932, that the American production under the duress of high stocks and historically low prices was forced down to a figure in line with current American industrial consumption.

When the 1937 industrial boom burst last fall the memory of 1930, '31, and '32 was still fresh in the minds of the lead miners of this country and they were not slow to realize that conditions had definitely changed. For this reason production dropped drastically during the first five months of 1938 and stocks never became unwieldy. Outside of the United States, however, lead production continued on a high level in 1938, with the result that foreign stocks of lead by July became cumbersome, just about the time that American consumption started to pick up.

The average price of lead in London during the decade ending in 1927 was almost £30 and during the last 10 years —the period including the world-wide depression—the average was approximately £16½. When during this last summer the price dropped below £14 most of the foreign producers realized that the profit in lead mining had disappeared.

Formation of Foreign Producers Association Important Event

Probably the organization of the Lead Producers Association of London is the outstanding recent event in the lead industry. This association plans through cooperation of the principal miners of the world, outside of the United States, to bring about a better relationship between the yield and consumption of lead. Of the world production, about one-fifth is domestically produced United States lead. It is informally understood that this cartel

* Presented to Metal Mining Convention of the American Mining Congress, Western Division, Los Angeles, Calif., October 26, 1938.

will put a floor under the lead price of closely £16. Assuming that as usual any imports will be lead in ores taking a duty of 1½ cents per pound, the above figure would correspond to 4.89 cents per pound for New York lead, as contrasted to a present price of 5.1 cents.

The attainment of such desirable world condition will have a wholesome effect on the United States domestic lead market, which must always have a definite relationship to the London world market. A New York authority indicates a normal spread between the two markets in dollars of not over $1.80. This is a closer tie-in with the London market than is probably generally appreciated, especially when the fluctuations of the value of the British pound in dollars is taken into consideration.

Any formula to indicate the condition of our domestic lead industry must include the following items: (1) volume of sales, (2) domestic lead stocks, and (3) New York lead price and its relation to the London market, including the dollar value of the English pound or the rate of exchange. To the foregoing may be well added the current amount of unfilled orders, by which I mean lead held for customers' account by the seller, whether at the smelter, refinery, or warehouse, which lead has been sold and invoiced or paid for but not shipped during the months specified in the sales contract. This is essentially lead owned by the customer and held or stored at the smelter or refinery or warehouse.

The importance of this figure is that it indicates whether lead actually sold is being absorbed by industry in some manufacturing use as compared with tonnage bought for replenishing of inventories or speculation.

Stock Situation Considerably Improved

The mere movement of pig lead from storage at the smelter or refinery to the warehouse of the manufacturer does not relieve overproduction, nor does it stimulate inquiry at advanced prices; only as the metal is put to useful purpose does it generate better prices and broader demand. The stock of domestic lead in all forms in base bullion, antimonial lead, refined pig lead and in process at the smelters has declined regularly since the annual peak figure of June last. Stocks of refined pig lead are closely equal to 3½ months of supplies at the present rate of consumption. The price of lead has improved steadily since the low of 4 cents January 1 last, but does not even remotely approach the 1937 prices which were the best since 1929.

Looking at the American picture we see that the lowest point of United States lead stocks in the past five years occurred in 1937. From that point they increased rather steadily until the 1938 high was reached during June last. Since June stocks have dropped steadily at the rate of, roughly, 8,000 tons a month and should continue to go down at about this rate until the fringe mines are again brought into production by higher prices. Preliminary reports of the Bureau of Mines indicate that about 196,100 tons of primary domestic desilverized lead, 114,500 tons of soft lead and 30,800 tons of desilverized soft lead were produced in 1938—a total output of 341,400 tons of refined lead from domestic ores, compared with 443,142 tons in 1937, a reduction of about 23 percent.

STANLY A. EASTON

Under Treasury Department regulations, a useful plan for smelting foreign lead in bond not only gives additional business to the United States smelters but furnishes American manufacturers duty-paid lead for use in articles manufactured for export. Normally there is a pretty steady demand for duty-paid lead, especially in the automobile industry, to be used in cars and trucks sold abroad. Under this procedure a bonded warehouse is set up at the refinery and smelter for receiving foreign lead-bearing ores. The lead content of these ores is checked in, and the smelter has one year to export an equivalent amount or pay the duty thereon.

Principal Lead Uses

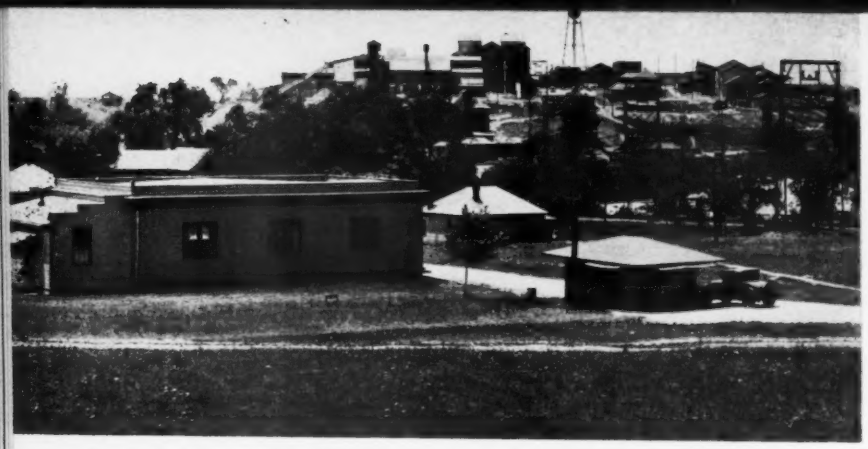
The Automobile Manufacturers Association reports that 31.4 percent of the total domestic lead consumption is utilized by the automobile industry. This fairly checks data from other sources.

For the last 10 years storage batteries have accounted for the greatest tonnage of lead. Automobiles are by far the largest users of storage batteries, with cable covering and white lead alternating for second place. Fifty-seven thousand tons of lead were used in 1937 in the manufacture of red lead and litharge. About 40,000 tons went into ammunition. Forty-five thousand tons were used in building operations, 22,000 tons in the manufacture of foil; and about the same amount in the production of solder. The newest large use of lead is in the manufacturing of lead-tetra-ethyl for tempering gasoline. While no figures are published which show the actual consumption for this purpose estimates for the 1938 consumption in this field exceed 25,000 tons. It might be well in passing to point out there is no salvage whatever on the lead used for this purpose.

Threat of Substitutes

Use of lead for pigments and cable covering are threatened by substitutes—mixed paints by reduced or entire absence of white lead, and cable covering by rubber and various compounds. Time and experience alone will demonstrate whether these substitutes can survive a long period of rigid experimentation. To some extent lead may permanently lose ground in these and other fields. On the other hand, new uses such as lead for tetra-ethyl may more than supplant such losses. It is highly improbable that there will be a permanent shrinkage in the total annual use of lead. The industry, especially in the three premier lead producing states, Missouri, Utah, and Idaho, does not report any substantial new production. Technically the industry was never in a better position to meet all demands made upon it.

Bunker Hill lead smelter at Bradley, Idaho



Part of the surface plant at the Mascot, Tenn., operation of American Zinc Co. of Tenn.

STATUS and PROSPECTS for ZINC*

By HOWARD I. YOUNG
President
American Zinc, Lead & Smelting Co.

A LITTLE over a year ago the zinc industry was being criticized because of the extremely low reserves of slab zinc at the producers' plants. A glance at the stock records since August 1937 when the low point of 11,200 tons was reached might indicate that the zinc producers took the criticism too much to heart, for in 10 months' time they have piled up a record-breaking stock figure of nearly 150,000 tons.

The stock of 11,200 tons that was available in July of 1937 represented actually less than one week's consumption of zinc at that time, and there was a situation in this country which brought about a condition that caused the industry some embarrassment in later months; namely, we had for two years out of three an unprecedented drought in the Northwest which materially reduced the production of electric power, and that in turn substantially reduced the production of zinc. At the same time, we had a strike of six months' duration at one plant in the retort industry which reduced the production by at least 11,000 tons.

Those two situations, together with the highly speculative condition that developed in the foreign market, caused a situation in zinc that brought into production, as we found in later months, more ores and metal than was actually needed.

During the time of this unusual situation we imported zinc into this country, and last year there was a total of approximately 40,000 tons of foreign zinc brought into the United States. Had it not been for the artificial reduction in output, our stocks would never have reached a point of less than 30,000 tons, which was approximately three weeks' consumption, and would have eliminated a lot of the frightened buying which occurred during the summer of 1937.

Starting in the third quarter of 1937 the rapid reduction in business activity was reflected in the consumption of all non-ferrous metals. During the nine months of this year we have shipped 269,000 tons of slab zinc as compared with 467,000 tons in the same period of 1937—a reduction of 57½ percent. You can therefore very readily picture from these figures why we have built up a tonnage of 150,000 tons in our stock, which was the highest stock figure reached at any time since 1930.

In 1930, when we had a drop in business activity, our stocks rose very rapidly to 143,000 tons, and the price declined. Inasmuch as zinc is a by-product with a number of the non-ferrous metal producers, production was not curtailed as quickly as it should have been.

Improved Consumption Late in 1938

Our shipments in September of this year were 44,000 tons compared with 48,000 tons in September of 1937. This shows a reduction of approximately 10 percent. Therefore, you can very readily see that the consumption has rapidly increased since June of this year. In October we expect our shipments to be in excess of our shipments in October of last year.

The principal consumer of slab zinc is the galvanizing industry. Under normal conditions galvanizing consumes 42 percent of the zinc production of the United States. Activity in the galvanizing industry went from a high of approximately 77 percent of capacity in 1937 to a low at the end of the year of slightly under 20 percent. The average for the first nine months of this year was 43.2 percent of capacity compared with 70.9 percent in the same period in 1937.

The recent figures available within the last week show the industry is now at 67 percent of capacity, compared with 66 percent a year ago. Therefore, you can see we are rapidly getting an improvement in consumption.

Work Toward Better Galvanized Products

The industry has been alive to the necessity of working with the consumers of zinc in developing better galvanized zinc products. The industry has spent a substantial amount of money through the activities of the American Zinc Institute in cooperating with the galvanizing departments of the steel companies in promoting better galvanized products. Galvanized products sold within the last few years are much better than those sold for a number of years during the war period. At that time, when zinc was scarce and prices high, it was the policy of the steel companies to cover their sheets with much less zinc than is being used today. In turn, those of you who use galvanized sheets bought what you thought was good material, and in four or five years you found that a sheet supposed to last 20 to 30 years had only a life of from five to 10 years. This condition was very detrimental to the zinc industry. The industry has accomplished much in the program to get better galvanized products.

Broadening Market for Die Cast Products

A substantial tonnage of high grade zinc is used in the automobile industry. The decline this year in

* Presented to Metal Mining Convention of the American Mining Congress, Western Division, Los Angeles, Calif., October 26, 1938.

automobile production has naturally affected the demand for zinc used in die castings. The production of new cars is on a conservative schedule but it is expected that the output of 1939 cars will exceed the production of 1938. The new models show a continued use of zinc die casting. The die casters are gradually broadening their markets to other fields. The consumption of zinc in pigments for the rubber trade has been slow, but with increased automobile production some improvement in the consumption is expected. Demand for pigment in the paint industry has been comparatively good, and with a continuation of the government housing program the demand should continue at the present rate or perhaps improve during the next year.

To sum up the consumption outlook for zinc and its products, prospects are good even at the current prices. The final quarter of 1938 should show increasing shipments and an improvement over the same period of last year. It is too much, however, to expect that within the next few months we will be back on the basis that we enjoyed in the early part of 1937.

Possible Beneficial Effect of Lead Cartel

It is too early to predict what effect the lead cartel which was recently formed in Europe will have on the output of zinc. A substantial part of the zinc production outside of the United States is a by-product of mines which produce other non-ferrous and precious metals, and with the operation of the lead cartel it is reasonable to expect some reduction in zinc production.

Regardless of consumption, our price here is governed to a great extent by the world price of zinc. Today the price in London is 3.29 cents per pound. Adding our duty and delivery charges at eastern seaboard, we are within 5 cents per hundred pounds of the London price. We therefore cannot expect higher prices in this country even with increased consumption unless at the same time the consumption outside of the United States is at a high enough level to cause improvements in foreign prices.

We are very hopeful that the present reciprocal trade agreements being considered between this country, Canada and Great Britain will not result in a reduction to the slightest degree of the present tariff on non-ferrous metals. It would be absolutely impossible for those in the zinc industry to meet the continually increasing costs with which we are confronted through labor regulations and other costs over which we have no control, and at the same time meet the foreign price with less tariff protection than we have today.

EDITOR'S NOTE: *Announcement of the Canadian Trade Agreement provisions some four weeks following delivery of Mr. Young's address came as a severe blow to the zinc industry. Notwithstanding that full data had been presented to the appropriate agencies, duty reductions of 20 per-cent on both zinc metal and ore were imposed in the new agreement.*

GOLD—Its Status and Prospects*

By HERBERT A. SAWIN
Economist
Yuba Consolidated Goldfields

INSTEAD of gold, what would you accept for money? A string of shells or a stamped bit of leather? Would you like a chip of porcelain or a pressed brick of tea leaves? Or perhaps a handful of pepper berries or a tiger's toenail? All of these have passed as money but my guess is that you would prefer gold. Back through the ages of civilized countries and elsewhere, gold has caught the eye and earned the confidence of mankind. Gold money made 2,600 years ago is still in existence.

Historic Acceptance of Gold Assures Its Future

At the last election in California the voters rejected, with no uncertainty, printing press money which some wag called "scrip tease." It takes no great knowledge of economics to see the danger of such so-called money. History has ofttimes recorded the failure of currencies not backed by gold or silver; in recent times gold, by preference. With the higher price for gold we saw a return to favor of natural color gold jewelry.

Some authorities claim that universal gold acceptance today is because of its inherent value as an ornament passed down to us from barbaric ancestors, appealing to our vanity and decorating our persons. Gold, ever popular, becomes more and more desirable as the price rises, and the jewelers' trade will absorb an ever-increasing part of new gold as produced. Whatever the reason, you and I are satisfied with the simple fact that gold is accepted. That acceptance is to us, and to the world, sufficient, and in its acceptance lies gold's future. We might say its history is its future.

The gold standard, when in force, is the strongest basis for international good will and trade. Nations abandoning that standard, spending their substance for wars or wild speculation, soon find that gold disappears. Individuals and treasuries alike hoard their gold. Worthless currencies drive it to cover or to safe depositories. We read almost daily of huge shipments of gold to the United States from war-torn European or Oriental countries. People have confidence in gold. Currencies and commercial paper, backed by gold, assume an important place in business, and other commodity values adjust themselves accordingly.

Thirty-five paper dollars, worth an ounce of gold, are good dollars. Stated thus, we understand why we use them daily without question. We are ex-

* Presented to Metal Mining Convention of the American Mining Congress, Western Division, Los Angeles, Calif., October 26, 1938. Revised by the author to include preliminary totals for 1938.

Gold dredging in Alaska on Cripple Creek—operation of Fairbanks Exploration Co. Pits seen at left result from gravel thawing operations

—Pacific Aerial Surveys, Inc., Seattle, Wash.

pressing our confidence in gold. Fifty or more paper dollars, worth an ounce of gold, would still be good dollars; however, I am not proposing such an adjustment. Not being outside the realm of possibility it would be interesting to speculate on the results of such valuations. Just now, my point is that gold is always acceptable. Money based on gold, even though we cannot jingle gold coins any more, as we once did, is acceptable anywhere. For this fundamental reason, the future for gold is assured. Supply and demand will govern commodity prices eventually, despite attempts to control markets, but a measure of value is necessary, and gold best answers that need.

As mining men, we are interested in the future for gold as a commodity. We might almost consider ourselves manufacturers making gold bullion out of ore—skilled workmen using machinery and chemicals to produce new wealth. The increased production resulting from revaluation is beginning to level off again. Before $35 gold brought into production marginal mining areas, miners were depending on improved machinery and methods to increase production, just as any manufacturer would do.

Require Modern Mining Methods Even at Higher Price

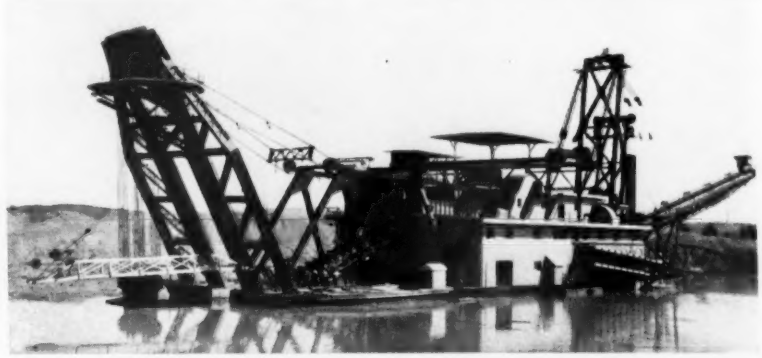
The efficiency of the individual gold seeker is almost nothing. This was true in early California days, and, according to a report recently issued by the Works Progress Administration, is still true. That report states that in 1935 a great army of unemployed were urged to seek gold on their own account for a livelihood. About 28,000 individuals recovered enough metal to make one or more sales to a gold buyer. The average daily gross income, for an average working period of 45 days, was $1.60. The average gross income of these 28,000 people for the year 1935 was $72. These figures are given to show the need for mechanical aids and good management in gold mining.

Successful producers of large quantities of gold from low grade ore constantly utilize discoveries made in the chemist's laboratory; the improved products of the steel maker and manufacturer, and new machinery developed from experience on the job. It is true that $35 gold brought into production many mines which could not be worked profitably at the old price. Better equipment and lower handling costs, however, have played an important part in the recent gold mining revival.

The cost of production, plus marketing, must—in any industry—be lower than a price which is attractive to the customers, if that industry is to flourish. Our mining industry is no different, on that score, from cotton growing, sausage making, or thousands of other activities which support a family, a city, or a nation. In gold mining we are fortunate—because of that age-old acceptance of our product—in always having a market. "We, the people" at the present time, guarantee to purchase anybody's gold for $35 an ounce. History records no surplus of the metal at any time, and periodical spurts in gold production have led to increased business activity; good times for all. The danger of a "golden flood" is rather far-fetched. More than 60 percent of the world's gold supply, produced since 1492, was mined after 1900. The business of the world and expanding industry of the last 38 years certainly found use for sound credit backed by gold. It takes no imagination to visualize a greater need for gold to carry on the business of providing essentials and comforts of life for the world's millions of people.

Advances in Dredging

Recently published reports state that in California during 1937 ten of the 25 leading gold producers were dredging companies. Because my contact with gold mining is principally through dredging, I should like to direct your attention to some advances made in dredging, which are making available for the world's use gold from placer deposits of comparatively low value. In building and operating these dredges, thousands of men are working—not only in the field, but also in factories making steel, machinery, rub-



Yuba Consolidated Goldfields dredge No. 17 at Hammonton, Calif. Still the largest and deepest digging dredge (digs 112 feet below water), but will be supplanted in size by same company's No. 20, to be completed in May, 1939

ber belts, castings and many other parts. A large modern placer dredge can cost from $500,000 to $1,000,000. Several dredges now working are in that class. Dredges, probably more than any other branch of mining, are large consumers of manufactured articles. Their increased production finds its way quickly into channels of trade, employing men in factories far removed from mines.

The new gold price revived a fading industry which, in its new life, found incentive to apply greater efficiency to old methods to further increase recoveries. Gold dredging ground in large areas is limited. High value ground in California has been disappearing steadily since the turn of the century. As a guide to the importance of California dredging, records indicate that 1938 will see California dredges recover enough gold to make the total produced since 1896 equal 10,000,000 ounces. From data published by U. S. Bureau of Mines we learn that in 1937, 46 bucket-line dredges in that state produced 322,961 ounces of gold valued at $11,303,635, about 1 percent of the world's known output for that period. In recovering this metal nearly 95,000,000 cubic yards of gravel were handled, making an average value per yard of 11.9 cents. Only through mechanical efficiency and under sound management can such operations be carried on profitably.

1938 Production Up 6 Percent

Preliminary figures compiled by the Bureau of Mines indicate that total mine production of recoverable gold in the United States, including territories, amounted to 5,106,109 fine ounces in 1938, valued at $178,714,000—an increase of 6 percent over 1937 output both in quantity and value. California again led the list with an output of 1,294,000 ounces, an increase of 10 percent over 1937. This, plus important increases in production from the Philippines, Alaska, Washington, Oregon, Idaho, South Dakota and South Carolina, more than offset decreases recorded from Arizona and Utah. Recoveries by bucket-line dredging were about 27½ percent of the total in 1937 and probably, on this basis during 1938, these California dredges produced about 357,000 ounces. Using this figure as 1 percent of the world's output for 1938, we can estimate the total production as 35,700,000 ounces. Converted at $35, its value is $1,249,500,000.

Several of the dredging companies have definite plans for future development based again on the age-old acceptance of gold. A dredge to dig 150 feet below present ground level was recently launched in California. Its displacement, when completed, will be about 3,750 tons. Larger dredges are being considered. Digging depths of over 200 feet are not impossible. The controlling feature is that deep dredging costs mount after 100-feet depths have been reached, for there must, necessarily, be more lost operating time. Also, the investment is greater. The combination of these factors develops a point where profits, and therefore dredging, cease. Further increase in the gold price would start the chain again. More marginal or sub-marginal dredging land would be brought into production. Increased production would be felt in factories serving the dredges, and payrolls would be spent for groceries. Other economic questions dominate the price of gold, however, and greater minds than mine have burned a lot of midnight oil seeking the right solution.

Plans for over 20 years dredging in one field are being made, depending only on there being no radical changes in material and labor costs. One large company has recently built a dredge in Nevada, developing, through mechanical efficiency, a property which formerly was not considered workable. Other factors enter all dredging pictures but these can usually be foretold.

Confidence in Gold's Future

Deep-digging dredges are reworking old fields—in one instance, for the third time—handling the old tailings and deep-lying virgin ground. These producers have confidence in gold, as do the producers who operate hard rock properties, overcoming such problems as mile-deep ore can bring. This confidence, which is backed by good, hard coin of the realm, is the same confidence that prompts you and me to take gold at an established price; or lacking an established price, to take gold anyway, because experience has ingrained within us the knowledge that gold, of itself, is a valuable and useful commodity.

Gold's value may change with the time, but its acceptability has remained unchanged for centuries. In that fact, I repeat, lies gold's future. Human nature, being what it is, insures that future.

SILVER OUTPUT DECLINES with LOWER PRICE

By WALTER E. TRENT
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BEFORE embarking on a review of silver in the past year the author believes it pertinent to outline briefly certain important facts bearing on the silver situation over the past five years during which action by the U. S. Government, in response to provisions in the Thomas Amendment to the Agricultural Adjustment Act of 1933 and in the Gold and Silver Purchase Acts of 1934, has largely dominated the domestic and world silver markets.

During the first two months of 1933 the silver price was less than 26 cents per ounce, but as a result of various laws enacted by the new Administration pertaining to monetary metals the price of silver advanced sharply. By Presidential proclamation on December 21, 1933, the price of newly mined domestic silver was fixed at 64.64 cents per ounce; this was increased on April 10, 1935, to 71.11 cents, and two weeks later was further raised to 77.57 cents where it remained until its reduction on January 1, 1938, to the 64.64 cent figure.

Increased Output During 1933-37

In this same period mine production of silver increased sharply, as follows (figures in millions of ounces): 1933 — 23.1; 1934 — 32.8; 1935 — 48.5; 1936—61.2, and 1937—71.0. Thus the 1937 production was over three times that of 1933, and was higher than any year since the previous peak of 75 million ounces reached in 1915.

It is self-evident, therefore, that the increased price has greatly stimulated not only the silver mining industry, as such—but also mining of copper, lead, zinc and gold, with which silver is commonly associated to a considerable extent, and from which operations it is recovered in sizable amounts as a co-product. From 1933 to 1937 the amount of silver recovered from ores mined principally for their silver content increased from 4.4 million ounces to 23.4 million ounces, or about 430 percent, with all western metal-producing states sharing in the increase. Mines were reopened in large numbers, thousands of men were put to work, and communities throughout the area enjoyed the benefits of revived business activity.

From tabulations made by the Bureau of Mines it appears that revenue actually received during 1933-37 by domestic producers of silver amounted to $166,400,000, whereas their revenue based on, say, 30-cent silver would have been about $71,000,000. The increment due to higher prices was thus about $95,400,000. Crediting against this figure the benefits received by labor through wages, and by government itself through taxes and lessened demands for relief funds, the net cost is reduced to a very nominal figure.

During this same period and continuing through 1938 United States purchases of foreign silver amounted to 1,523,200,000 ounces to which may be added 113,000,000 ounces of nationalized silver acquired as a result of Executive Proclamation of August 9, 1934. The grand total of Treasury silver holdings, including coin in circulation, thus amounted to about 2,575,000,000 ounces as of the close of 1938. At the same time gold holdings increased to a total of $14,500,000,000 and thus the purchase of some 1,165,000,000 ounces of silver was still required to effectuate the provision that 25 percent total monetary reserve stock be in white metal.

The Royal Mint Act of 1920 in Great Britain was a signal for a general upward revision in silver coining rates and increased consumption in silver for monetary uses. During the period 1921-1937, inclusive, silver consumed in coinage has enjoyed a net increase of 1,359,141,488 ounces, despite many recent reports to the effect that consumption of silver is rapidly declining. Further, the average coining rate of silver in the ten leading countries of the world has been materially raised instead of lowered as commonly believed, the average coining price now being at the rate of $2.12 per ounce, gold basis. In addition to the above figure the United States has increased its monetary use of silver in the form of silver certificates since 1937 in the amount of 1,098,273,372 ounces and the Treasury Department holds in its general fund not yet allocated to monetary use, 1,016,305,000 ounces.

The net increase in the consumption of silver for the 1933-1937 period was 195,131,410 ounces in contrast to the net withdrawal of gold from monetary uses of $1,216,907,417.

Developments of 1938

While the United States has taken the lead in the accumulation of silver since the Silver Purchase Act of 1934, it is becoming increasingly clear that many countries are accumulating silver and the world's markets are proclaimed by authorities to be extremely thin in selling orders. There is justification for the conclusion that many countries believe that the acceleration given to the utilization of silver in the settlement of foreign trade balances is increasing and leads to a new level of internation silver monetary utilization.

It will be recalled that on December 31, 1937, the President lowered the price for newly mined domestic silver from 77.57 cents to 64.64 cents per ounce, the latter price having continued without change throughout 1938. Accompanying this lower price was a marked decline in United States production. According to preliminary estimates by the Bureau of the Mint the 1938 refinery output of silver in the United States (excluding the Philippine Islands) amounted to 59,801,000 ounces, compared with 71,086,000 ounces in 1937, a reduction of 16.7 percent. It is worthy of note that the lowering of price referred to above amounted to 15.9 percent—almost identically the same figure as the percent drop in production. Important silver producing states suffering from the reduced output, in order of the decreases, were: Montana, Utah, Arizona, Idaho, Nevada, New Mexico and California.

As a result of curtailed metal mine operations in Arizona, Colorado, Idaho, Montana, New Mexico, Nevada and Utah, employment in these states—all important silver producers—during the period December 1937, to October 1938, dropped 23.9 percent and payrolls 29.4 percent—these figures having been compiled by the Bureau of Labor Statistics.

World Production and Price

World production of silver in 1938 has been estimated at 264,800,000 ounces, a reduction of 4 percent from the 275,000,000 ounces produced in 1937. Of the 1938 output the United States has been credited with 61,400,000 ounces, Mexico 85,000,000 ounces, Canada 23,300,000 ounces, South America 32,400,000 ounces, and all other countries about 62,700,000 ounces. Average New York "official" price for silver in 1938 was 43.225 cents per ounce, compared with 44.883 cents in 1937 and 45.087 cents in 1936.

On December 31, 1938, the President issued a proclamation continuing the price of 64.64 cents per ounce to be paid for newly mined domestic silver through June 30, 1939. Considerable dissatisfaction was evidenced when it was noted from the wording that payment of this price would be made only for silver delivered to the mint before and including June 30. Following effective protestations this was revised in the Newly-Mined Domestic Silver Regulations released by the Treasury January 16, making the price applicable to all domestic silver mined up to June 30. The delivery requirement would have been decidedly unfair to many silver producers whose product of concentrates or ore may require as much as three or four months to be smelted, refined and delivered if smelter schedules are crowded.

It is obvious from an analysis of events in world silver during the past six years that the future of the industry and the safeguarding of the large stocks of metal now owned by the United States Government hinges on expansion in use of the white metal in coinage and as reserves for paper currencies. Trends toward use of managed currencies and international barter agreements are working havoc with any attempt at correcting the present maldistribution of both silver and gold. It is extremely doubtful, in the opinion of the author, that such managed currencies can long continue without sound metallic reserves to back them up.

What is needed most is a return to peaceful conditions throughout the world, so that capital which in recent years has been seeking a haven in the United States may go back to its point

of origin. This may be a long time in coming.

Development of New Uses

In an endeavor to develop new uses for silver which would utilize the metal industrially in tonnage quantities, leading silver producing companies are sponsoring two extensive research projects: (1) the American Silver Producers' Research Project, with 15 research fellowships placed at seven universites, Battelle Memorial Institute and the National Bureau of Standards; and (2) The Rare Metals Institute has a separate grant for research at the California Institute of Technology, with six research fellowships.

Progress and results of the former project have been outlined in detail by interim reports and in general by a summary article.* Among the promising possibilities for extended industrial uses are engine bearings; silver-clad base metal (copper, nickel and steel) for chemical equipment, shipping containers for corrosives, fruit juices, pharmaceuticals, etc.; alloyed and unalloyed silver for electrical uses, brazing metals as a construction material, etc.

* Dornblatt, A. J., "The Development of New Uses for Silver": Mining Congress Journal, Oct. 1938, pp. 31-34.

Minor Metals and Nonmetallic Minerals*

By JOHN WELLINGTON FINCH
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KEEN interest centers at present in a number of so-called "minor metals" and in the nonmetallic minerals—all of them essential commodities in our industrial economy. Some of them are of relatively recent importance and in a sense are modern metals associated with speed, reduced weight, and durability under adverse conditions. The importance of the nonmetallic minerals is rarely appreciated by the layman and seldom by the metal miner. However, in terms of aggregate value of products and number of men employed, they run neck and neck with metal mining, sometimes ahead. In volume of production, they normally approach half a billion tons a year, or considerably more than double the ore output of all metal mines, and more than ten times the annual tonnage of pig iron and nonferrous metals.

The extending use of the minor metals in industry is a result of the better understanding of metals and alloys that are designed for specific purposes. A feature of their production is the high prices they bring in the market. Compare the prices of iron, copper, lead, and zinc, for example, with those of aluminum, magnesium, molybdenum, tungsten, and vanadium. An added attraction for their producers is the excess of demand over domestic production. However, a study of the import figures reveals alarming deficiencies in the domestic supply of such basic raw materials as bauxite, manganese ore, chromite, tungsten ore or concentrates, vanadium concentrates, and a number of others. The fact that American industry is so largely dependent on foreign sources for most of these materials stands as a challenge to American technical ability and ingenuity to devise means or processes that will supply the need from our own resources.

Ferro-Alloy Metals

The ferro-alloying metals, as the name signifies, are used extensively in ferrous metallurgy; consequently, their market pattern follows in general the vagaries of the parent steel industry, but the extremes are not so pronounced. As a result of more exacting demands for performance under a given set of conditions, custom-made steels are becoming more important and the trend of American alloy-steel production is steadily upward. The utility of such steels is dependent upon the addition of one or more ferro-alloying metals, including chromium, manganese, molybdenum, nickel, tungsten, and vanadium. Each ferro-alloying metal has specific applications for which acceptable substitutes have not been developed. Consequently, it is essential that supplies of raw material continue to flow into industry.

Manganese

From the standpoint of quantity and value, manganese is first in importance. This element, essential in the present art of steel making, continues to be produced in large part in countries of small consumption, with the Union of Soviet Socialist Republics as an exception. Higher ocean freight rates and expanded demand have served to increase prices in recent years, but the low rate of activity in American steel mills in 1938 relieved pressure on world sources. American output, however, did not respond to the enhanced market conditions and, as in the past, our supplies are met very largely by imports. While deposits of varying grades and sizes are known to exist in a number of states, large deposits of acceptable-grade ore have not been found, nor have low-grade ore bodies susceptible to cheap methods of concentration been developed to the point where they are able to compete seriously with foreign deposits, despite varying degrees of tariff protection over the past 15 years. In 1937 our imports of manganese ore for consumption were 911,922 long tons, valued at $10,451,602, while domestic production was only 40,241 tons, valued at $1,062,399. Thus in a year

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of near-record production in the iron and steel industries, less than 10 percent of our manganese requirements were met from domestic sources despite the high prices that were maintained.

Chromite

Chromite is next in volume and perhaps in importance. The continued progress in the manufacture of alloy steels, particularly the development of stainless steels, has created increasing demands for metallurgical chromite. Expanded application is noted also in chemical and refractory outlets where lower-grade chromites, which are more abundant, may be used. Chromite, like manganese ore, is not produced to any great extent in countries where it is consumed, with the U. S. S. R. again the exception. In 1937, imports for consumption into this country reached the unprecedented total of 553,916 long tons, valued at $7,324,488. And again we note that over seven million dollars' worth of raw material was purchased abroad. As in the case of manganese ore, domestic production is very small, and while deposits of chromite are known to exist in this country, they have been of little commercial importance in late years, due either to grade or extent, or both. In 1937, shipments from domestic mines increased and amounted to 2,321 long tons, valued at $14,888, but previously shipments had been only a few hundred tons annually. The increase in 1937 was due to exploration and development by a domestic consumer in an endeavor to obtain supplies from deposits in California and Oregon. In this connection it is interesting to note that a domestic producer was the low bidder early in 1938 on 2,000 short tons of metallurgical-grade chromite to be supplied to the Navy for emergency stockpile purposes. It is understood, however, that no deliveries have been made as yet. Commercial shipments from the Philippines to the United States began last year, and several deposits of high-grade metallurgical ore are being worked, but the large reserves often referred to are of the lower grade and not suitable for metallurgical use unless beneficiated. Some of the shipments have gone to Japan.

Tungsten

China is the principal tungsten producer. Monopoly controls in that country, followed by a threatened blockade of Chinese shipments by the Japanese, have caused high prices to maintain for several years. Higher prices resulted in stimulating activities elsewhere, and in 1937 our domestic production amounted to 3,500 short tons of concentrates (on the basis of 60 percent WO_3). Imports of tungsten ore and concentrates (50 percent WO_3 basis) in 1937 amounted to 5,842 short tons, valued at $2,940,038. Thus, more than 60 percent of our supply of tungsten in 1937 came from abroad. There has been much activity in tungsten exploration and development in our western states during the past few years, and a number of new concentrating mills have been installed and equipped. The immediate future for tungsten, however, is beclouded by conditions in China, although supplies continued to come from this source despite the Sino-Japanese conflict.

Molybdenum

In the molybdenum industry the situation is entirely different; molybdenum is one of the few ferro-alloying metals of which this country has an ore supply ample for its own needs. The story of the phenomenal growth of molybdenum sales and of the Climax mine is well known to all of you, but it should be recorded that additions to mill capacity, completed in 1937, permitted treatment of more than 10,000 tons of ore a day. Despite the increase in capacity, the mill was pushed to meet orders last year. Of material interest is the recovery of molybdenum from the small fractional-percent content in some of the American porphyry coppers. In 1937, the Utah Copper Company recovered over eight million pounds of molybdenite concentrates from its copper-milling operations. This company is now the second largest world producer, with an output greater than the total of any country other than the United States. Molybdenite concentrates are also being recovered at Hurley, N. Mex.

Vanadium

Vanadium, alone or together with other alloying elements, finds wide application in alloy steels. Much of the vanadium used in this country in recent years came from Peru. However, domestic production in 1937 increased sharply as a result of the completion late in 1936 of the new plant of the U. S. Vanadium Company, at Uravan, Colo., to handle low-grade carnotite from the Paradox Valley which cradled the domestic radium industry before it collapsed in 1923. As a result of this and other developments, this country will be less dependent than formerly on foreign sources for supplies of vanadium.

Light-Weight Alloys

Light-weight metals and alloys find extensive use in the manufacture of air craft for both commercial and military purposes, since the bulk of the metal used in the fabrication of an airplane consists of aluminum, magnesium, or alloys thereof. In this connection it should be noted that a large part of our airplane production is made on the West Coast—perhaps as much as 75 percent in value. Continued research is broadening the field of application of aluminum and its alloys. With recent advances in the treatment of magnesium alloys for corrosion resistance, there has been a greater demand for sheets, castings, and extruded products as construction materials. The trend in the use of aluminum and magnesium is definitely upward, and new records were established in 1937. The decreased domestic industrial activity during 1938 has been felt in the light-metal industries,

Another record molybdenum production was made in 1938 by Climax Molybdenum Co. at Climax, Colo.

but curtailment has been less pronounced than for some of the other metals.

Aluminum

The United States is the principal producer and consumer of aluminum, but the Arkansas deposits are able to supply only about one-third of the bauxite ore from which the aluminum is derived; the remaining two-thirds must be imported. In the past, virtually all of the aluminum has come from bauxite, but processes using clays, leucite, and alunite have been developed and are being tried both in this country and abroad.

Magnesium

Germany leads the way in magnesium, partly as a result of the policy of using metals derived from available domestic raw materials. At present, relatively more magnesium is consumed in Europe than in the United States, but it is believed that the time is not far distant when domestic consumption here will increase materially. Thermal reduction processes using magnesite or dolomite as raw materials are being introduced in some European plants. Our magnesium resources are plentiful, since this material may be derived from magnesite, dolomite, brine, or even sea water.

Antimony

Until the Laredo, Tex., smelter was built in 1930, the United States, like the rest of the world, was dependent mainly upon China for antimony. This smelter, which operates on Mexican ore, serves to prevent violent fluctuations in the volume and price of Chinese metal. The Sino-Japanese conflict caused great concern in world markets regarding the continuity of antimony supplies. Prices jumped, and for a period of 30 days in 1937 quotations on Chinese metal were suspended due to lack of material. Subsequently, supplies from the Orient became plentiful, and, with lower demand in this country, prices fell rapidly and continued to decrease during the first half of 1938. While a large part of the antimony originates outside the United States, a substantial tonnage of ore was shipped from Alaska last year, and it has recently been announced that the American Smelting and Refining Company plans to build a by-product plant at Perth Amboy, N. J., capable of producing 50 to 75 tons of antimony daily.

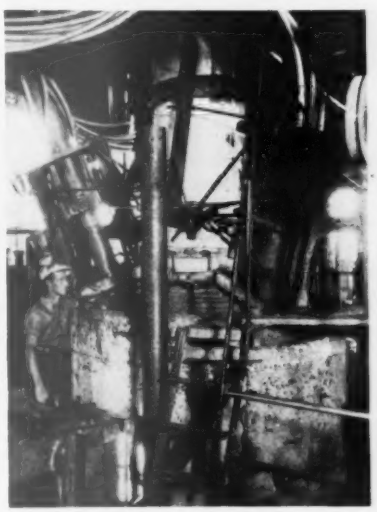
War, likewise, has increased the significance of mercury. While there is a considerable domestic production, the United States for many years has imported a part of its requirements. The outcome of the struggle in Spain is the largest uncertain factor on the horizon at the moment.

Electrometallurgical experimental station of U. S. Bureau of Mines at Boulder City, Nev.

Metallurgical Research Expanded

Spurred by the need for processes that will enable domestic raw materials to supply the demand for minor metals, the Bureau of Mines has been conducting an extensive program of metallurgical research.

Of particular importance in the western part of the United States is the possibility of establishing electrometallurgical industries at points adjacent to adequate mineral supply and within easy reach of power developed by the various large river-control projects. The Bureau's approach to this problem has been based on the idea that the development of new materials for whose production the West has natural advantages would be of more value than an attempt to produce materials that are now made elsewhere, usually in ample quantities, by well-known methods.



Electric furnace in building shown above

An important objective of the program is to determine the possibility of producing deficiency metals, essential to armament and munitions, from domestic ores; and wherever possible to promote the production of these metals for peace-time uses and thus make them available in an emergency. The program includes such problems as the recovery of manganese, chromium, nickel, antimony, magnesium, and boron from well-known, readily accessible mineral deposits.

Electrolytic Manganese

A method has been developed for the production of manganese, and several hundred pounds of high-purity electrolytic manganese have been produced from ores containing from 16 to 40 percent manganese. This electrolytic manganese is an almost ideal material for an alloy base; and it is estimated that its cost will approximate 6 or 7 cents per pound. It has a silver color; it is permanent in air, and although brittle when pure, forms ductile alloys with relatively small additions of other metals. Its alloys with silver have been found to have exceptionally good properties for electrical contact material. Preliminary experiments indicate that it may replace nickel and copper in such alloys as those of the monel, nickel-silver, and stainless steel types.

Work is going forward, as our facilities permit, on the other objectives of our program, which, of course, could be accelerated with additional funds. It now seems probable that our recently developed method for the production of high-purity chromium metal will soon be ready for release to the industry. This method is based on chlorination of chromite ore, followed by gaseous reduction of the chloride to metallic chromium.

The laboratory phase of our investigation on the production of high-purity magnesium from magnesite is well in hand; and here again we are hopeful of overcoming the practical difficulties that have been encountered and of demonstrating the utility of a process that should make this valuable metal available in a high state of purity at a moderate cost.

A start has also been made on investigations relating to the recovery of nickel from domestic ores, the development of methods for the production of boron and its alloys, and of the treatment of antimony ores and alunite.

Nonmetallic Minerals

Bigness alone is a faulty yardstick of national importance; but from the standpoint of utility and general industrial and military significance, supplies of nonmetallic minerals are quite as essential as supplies of metal. Most industrial minerals were produced in greater quantities in 1937 than in any previous year since 1930. Only a few, however, made all-time records, and the group as a whole has by no means regained the ground lost since 1929.

The two biggest industrial mineral industries are those that supply building materials and fertilizers. A building boom is long overdue and eventually the demand for fertilizers may spiral upward again, but for the present the fortunes of producers in these fields are depressed with those of the builder and farmer. Despite great efforts of Federal, state, and local government bodies to revive the industry, building of all kinds, public and private, was only half as active at mid-year 1938 as private building alone was in 1928. And while the Tennessee Valley Authority's distribution of superphosphate boosted fertilizer sales to a new record in 1937, commercial sales were much less than they were in 1930, and during 1938 they dropped probably as much as 20 percent.

A third broad group of nonmetallic minerals comprises those that are used directly in manufacturing industries that do not cater so exclusively to builders or farmers, and wherein technologic advances that lower costs or better the product may be reflected quickly in larger sales. Glass, paint, paper, rubber, and certain ceramic industries are among those that at times have managed to lift themselves above their 1929 peaks, and such industries are demanding, and getting, more and better materials from mines and quarries.

Beneficiation Extended to Cheap Materials

Industrial mineral producers have refuted the doctrine that it does not pay to try to beneficiate materials that sell for less than $5 or even $1 a ton. By employing the skills of geologists, engineers, metallurgists, and chemists, we have expanded our mineral resources and freed ourselves recently from supposed dependence upon foreign supplies of such important items as potash, nitrogen, iodine, and china clay. As a result, I doubt if a case of real necessity could be sustained today for imports of any industrial minerals except perhaps mica, asbestos, and a few optical crystals—and recently we have heard that a suitable substitute even for mica can be centrifuged from bentonite. Better technology has created new industries such as those that produce bentonite, vermiculite, mineral wool, or pyrophyllite as well as brand new markets for old minerals—such as the glass industry has recently afforded for feldspar. The boldness with which this matter of economic supply of minerals is being attacked is illustrated further by the successful extraction of bromine from the Atlantic Ocean, of magnesium salts from the Pacific, and of nitrogen from the air.

Industrial Minerals as Metal Mine Byproducts

In conclusion, I should like to touch upon the growing importance of industrial minerals as by-products of metal-mining enterprises. We can scarcely hope to match the pork packers in utilizing everything but the squeal, nevertheless modern concentrating technique can separate pure minerals so cleanly that a microscopic study of the gangue may suggest new sources of revenue. Repeatedly we have seen the tailing piles and waste dumps of a previous generation reworked for the metals they still contain, and it is time now to appraise them, also, as potential sources of industrial minerals—not merely for road materials and concrete aggregate, but for mica, feldspar, fluorspar, zircon, rutile, phosphates, silica, and fillers.

SECONDARY and SCRAP METALS in 1938*

By E. W. PEHRSON
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and

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INTEREST in secondary metals during 1938 centered largely on the proposed embargo on exports of iron and steel scrap, particularly during the first half of the year when industrial activity and demand for scrap were trending downward. Senator Schwellenbach's bill (S. 2025, 75th Congress) to restrict foreign shipments of ferrous scrap was patterned after the Faddis-Barbour bill, which prohibits exports of tin-plate scrap except under license issued by the President. Final hearings on S. 2025 were held in April 1938 before a subcommittee of the Committee on Military Affairs of the United States Senate. Extensive testimony was presented on both sides. The War and Navy Departments recommended passage of the bill, but the Departments of State, Interior and Commerce rendered unfavorable opinions. Pressure for passage of the bill moderated after the slump in steel production and scrap prices, which took place the latter part of 1937 and early in 1938, and the bill died in committee.

Further consideration of this proposal in the new Congress is virtually assured. A similar bill, H. R. 979, was introduced into the House of Representatives by Representative Crawford of Michigan on the opening day of the current session, and Senator Schwellenbach has reintroduced his bill (S. 651, 76th Congress) in the Senate.

Representative C. A. Hoffman's bill,

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H. R. 61, proposes to extend the provisions of the Faddis-Barbour bill, approved February 15, 1936, to "other scrap containing tin together with drosses."

Bureau of Mines Establishes Secondary Metals Section

An event of unusual interest was the recent announcement of the establishment of the Secondary Metals Section of the Bureau of Mines at Pittsburgh, Pa. This action was necessitated by the growing demand upon the Bureau for authoritative information in this field. The Bureau's various fact-finding activities in regard to scrap will be consolidated in the new section and expanded as need and opportunity arise. [*Ed. Note*—Further details will be found on page 82 of this issue.]

Statistics Show Decline in Scrap Trade

Considering the secondary metals trade from a statistical viewpoint, the record shows that the industry was decidedly worse off in 1938 than in 1937. However, the downward trend was halted at midyear, and during the last half the trend was upward. Production and consumption reflected the sharp recession in industrial activity, and average prices were considerably below those for 1937. Much of the decline in prices from January to May, 1938, was overcome in the remaining months, so that quotations at the close of the year in general compared favorably with those on January 1; in some instances actual gains were recorded.

Complete figures on production in 1938 are not available, but preliminary data issued by the Bureau of Mines indicate that the recovery of secondary copper, lead and zinc at primary smelters and refineries declined sharply, that of copper from 156,600 short tons in 1937 to 92,500 tons in 1938, that of lead from 29,986 to 23,000 tons and that of zinc from 51,554 to 28,300 tons. Consumption of iron and steel scrap probably did not exceed 20,000,000 long tons in 1938 compared with 38,000,000 tons in the previous year.

Exports of Ferrous Scrap Decline

Exports of iron and steel scrap likewise fell abruptly in 1938, shipments for 11 months totaling 2,834,343 long tons compared with 4,095,334 tons in all of 1937. Tonnages sent to Japan during the two periods were 1,363,281 and 1,901,202 tons, respectively. A sharp decline also was noted in shipments to the United Kingdom, but those to Germany nearly trebled, while Italy took approximately the same amount in 1938 as in 1937.

Exports of tin-plate scrap, regulated by the National Munitions Control Board, dropped from 14,126 long tons in 1937 to 11,368 tons in 11 months of 1938, Japan taking virtually all in both years. Allotments issued for 1939 are limited to 20 percent of production in 1937 whereas those issued for 1938 were based on 25 percent of 1936 production. The reduction in the percentage limitation for 1939 will be offset by the larger production in 1937, so that quotas for the current year probably will equal, if not exceed, those for 1938.

Exports of scrap copper were well-maintained during the year, figures for 11 months totaling 20,122 short tons compared with 20,914 tons in all of 1937. Germany continued to be the largest customer, but Japan's purchases declined about 70 percent. This was offset, however, by increased shipments to other European countries.

Scrap Prices Fluctuate Widely

Prices for nonferrous scrap followed the same general trends as those of the primary metals and were influenced directly by the same factors. However, scrap copper quotations reflected the foreign price of refined metal rather than the domestic price. During the latter part of October, when domestic and export prices for electrolytic were equal at 11.025 cents per pound, No. 1 copper wire scrap was quoted at 9.125-9.375 cents per pound (dealers' buying prices). The producer's price for domestic refined copper was maintained at 11.025 cents for the rest of the year, but by December 31 the export quotation had declined to 10.150 cents and scrap had dropped to 8.25-8.50 cents. At the end of May export copper reached a low for the year of 7.85 cents per pound, while in the domestic market No. 1 copper wire dropped to 6.375-6.625 cents. The high point was reached the middle of October, at which time the export price was 11.125 cents, and dealers' prices for No. 1 copper wire scrap were 9.00-9.25 cents. Refinery buying prices for this grade of scrap reached a peak of 9.75 cents on October 15 and 17.

A unique feature of the refined copper market in 1938 was the wide spread between producers' prices for domestic copper and quotations on the outside market. In December, discounts on electrolytic copper in the open market amounted to as much as 1.25 cents per pound. This was attributed by the American Metal Market to selling pressure from domestic refiners of scrap who were unable to dispose of their surplus supply abroad at satisfactory prices.

The many fluctuations in the price of scrap automobile radiators were occasioned by the frequent changes in prices of tin and copper. Late in May and early in June refiners' buying prices on radiators were reported at a low of 4.25 cents per pound, and the latter part of October at a high of 6.875 cents.

The trend of the New York price of lead was indicated in markets for old automobile storage batteries, the principal source of secondary lead. The lowest returns to dealers during the year were realized during the latter part of May and most of June, when New York lead was quoted at 4.00 cents per pound and treatment charges on scrap battery plates stood at $16 to $17 per ton. The best returns were during October and November, when New York lead reached 5.10 cents and treatment rates stood at $15 to $16. At the close of the year lead was quoted at 4.85 cents, and smelter charges ranged from $16 to $17.

Following the decline of the St. Louis price of zinc in late May and early June to a low of 4.00 cents per pound, smelter bids for old zinc dropped to 2.25 cents. The high point of the St. Louis zinc price was reached the latter part of October and first half of November, when the quotation was 5.05 cents. During this period the price of old zinc ranged from 3.25 to 3.40 cents but did not reach the high of 3.75 cents attained early in January. Following the announcement that effective January 1, 1939, the tariff on slab zinc would be reduced from 1.75 to 1.40 cents per pound under the Canadian trade agreement, signed November 17, prices dropped sharply. At the close of the year virgin metal was quoted at 4.70 cents at St. Louis and old zinc at 2.75 cents.

The price trend of scrap iron and steel was downward from the first of the year until the early part of June as demand from both foreign and domestic consumers fell off, but with the improvement in industrial production the last half of the year markets reacted sharply upward. The price of No. 1 heavy melting steel at Pittsburgh declined from $14.00-$14.50 per long ton at the beginning of the year to

$10.50-$11.00 the middle of June and then rose to $15.50-$16.00 at the close of 1938. In 1937 monthly average prices ranged from $13.56 to $22.77 per ton, averaging $18.96.

Technologic Advances

Modernization of equipment and improvement in metallurgical processes for the treatment of secondary metals continued throughout 1938. New sweating furnaces for automobile radiators were installed at two refineries, and a number of ingot makers have installed new furnaces for the production of brass ingots. In this field the manufacture of special grades of brass mixtures is becoming increasingly important. Several operators report improvements in their processes for refining of solder and babbitt mixtures and brass, which have reduced costs.

The installation of baling presses for iron and steel scrap in dealers' yards is continuing, and 115 are now reported to be operating in various sections of the country. Old sheet from scrapped automobiles is receiving particular attention, and the indications are that increasing tonnages of these bundles, which are classified as No. 2 melting steel, are coming onto the market.

BITUMINOUS COAL Loses Heavily

● *Production Drops 23 Percent — Mine Modernization and Research Progresses*

By HOWARD N. EAVENSON
Consulting Engineer
Eavenson, Alford & Auchmuty

THE year 1938 will be remembered by most producers of bituminous coal as one of the worst years in their history, and by many of them as the year when their losses were greater than in any previous year of this depression period. For them almost any change will be an improvement.

A number of factors helped to cause a reduction of output of about one hundred million tons below that of 1937, preliminary figures released by the National Bituminous Coal Commission showing a total production of 342,407,000 tons in 1938, compared with 442,455,000 tons in 1937—a decrease of about 23 percent. The beginning of the year found large stocks on hand, partly due to decrease of consumption and largely to stocking in anticipation of Coal Commission prices; in February the unseasonable warm weather began, lessening the demand for domestic coal and also shipments from the lake docks, with the result that the carry-over was unusually large and the lake shipments during the year were correspondingly reduced. In the fall the demand for industrial coal increased somewhat, but shipments were far below those considered normal for the season. Competitive fuels suffered slight, if any, losses, illustrating further the impact that their use is making upon bituminous coal.

Price Decline Follows Withdrawal of Commission Minimums

The prices established by the Coal Commission, effective in December 1937, were withdrawn in February. On account of the accumulation of large stocks, not much industrial coal was sold during this period, and domestic sales had not been affected much by them; after their withdrawal coal prices began to decline, and with few exceptions this movement has continued. For many companies, contrary to usual experience, realization in November was the lowest for any month in the year. If the increased costs are considered it is probable that the average realization for 1938 will be lower than that for any year since the war.

Coal Commission Still Working on Final Price Setting

As a result of court decisions the Coal Commission in February withdrew the prices it had established in December. Several months were consumed in conferences and in working out the proper plan of procedure to comply with the Act, and the remainder of the year was occupied in holding the necessary hearings about establishment of costs, of classification and suggested prices by the district boards. Correlation of prices for the several districts in the various market areas had only been begun at the end of the year, and this and the final setting of prices will consume some months of 1939.

A final decision about making public the cost data submitted as confidential by producers has yet to be made by the courts, and undoubtedly when prices are finally set the constitutionality of the Act itself will be tested. One point in particular has puzzled many producers, with the rigid price structure established for every size and with the difficulty of balancing shipments of sized coal from day to day by mines screening their coal (and substantially all mines do so nowadays)—namely, how is a mine to run if it takes even a small fraction of the time to adjust a price to this condition that it does to make new prices?

The disturbing features already mentioned have obscured the effect of competitive fuels upon the bituminous coal markets. Sales of small stokers are growing faster than those of oil burners, but as nearly all of these are going into old plants not much increase of demand is resulting, although fewer owners are converting coal to oil heat. Few coal stokers are going into new houses, as nearly all of these installations are for oil, and until coal heat can be furnished as conveniently as oil or gas this will continue to be the case. Increased efficiency in combustion is still progressing, and it is difficult to see any signs of a larger demand for coal than that of 1937 for several years.

Mine and Preparation Modernization Proceeds

Wanted—expanded markets for properly mined and well prepared coal

In the production end of the industry considerable progress was made in the mechanization of mines, both by mobile loaders and conveyors, and a number of new cleaning plants were built or started. The tendency toward better preparation is evident everywhere, the unfortunate result being that all of the savings made or expected —and usually more—have been absorbed by the reduction of realizations; the producers have been, and are, furnishing an increasingly better product at less cost to the consumers.

Efforts have been made, without success, to eliminate the emergency freight charges which expired during the year. They have been continued indefinitely and represent a substantial contribution by the public to the railroads, and increase the tendency to use the lower labor and freight-cost liquid fuels, rather than the solid ones.

Labor conditions during the year were quiet, and with the final unionization of the Harlan Co., Kentucky, field, the industry is now substantially 100 percent organized.

During the year progress was made in research into the fundamental composition of coal and hydrogenation studies, and some elaborate tests of combustion conditions on large stokers under operating conditions were completed, although final results are not yet available. Bituminous Coal Research, Inc., completed the program under way at Battelle Memorial Institute and has ceased work until financial support can be obtained.

ANTHRACITE Output Down 13 Percent

●*Defeat of State Control Plan Features Year's Developments*

By LOUIS C. MADEIRA III
Executive Director
Anthracite Institute

AS THE members and staff of the Anthracite Institute survey the closing year they feel a sense of relief, due principally to the successful battle waged against threatened legislation in Pennsylvania that would have placed the industry under complete dominance of a state commission, in addition to putting the state into the anthracite producing business in competition with established firms.

Defeat of the four so-called Lauck Commission Bills, which embodied these features, in the special session of the Legislature which adjourned only November 30, was probably the most important action of the year for the anthracite industry. In opposing the measures, which never came to a vote, the producers were aided by all of the state retail associations and other dealer organizations. The bills had considerable support from several sources and constituted a serious threat to producers and dealers alike.

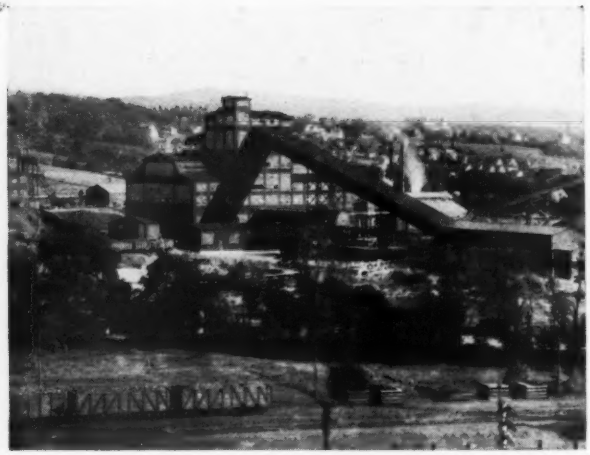
Production Decreased About 13 Percent

Mild weather in the spring of 1938 and again in the late fall was the principal factor affecting the anthracite market adversely during the year, with the result that final figures show production in 1938 at about 45,054,000 tons—off some 13 percent from 1937. As 85 percent or more of all anthracite mined is used for space heating, and only a small part for industrial purposes, the anthracite market is particularly sensitive to weather conditions. A cold January and February should make up lost tonnage readily.

Canadian Trade Agreement Revision Disappointing

The industry was only partly successful in its fight against the Canadian duty and excise tax on Pennsylvania anthracite. When the new trade agreement between the United States, Great Britain and Canada was announced November 18 it was learned that the duty of 50 cents per ton was to remain, but the excise tax of 3 percent, amounting to about 20 cents per ton, will be removed after January 1. As representations for the removal of all such charges had been made on this side of the border by the anthracite operators, the United Mine Workers, the Association of American Railroads, the Commonwealth of Pennsylvania, and others, and on the Canadian side by the Canadian Retail Coal Merchants Association, Inc., it had been expected that the 50 cent duty would be stricken off, as well as the excise tax.

In 1937 there were 2,003,000 tons of Pennsylvania anthracite shipped to Canada, and indications are that the 1938 tonnage will exceed that by not



Marvin anthracite breaker of the Hudson Coal Co.

more than 100,000 tons. The fact that the excise tax will be off after January 1 is probably operating to keep December shipments at a minimum.

Another trade agreement in which the Anthracite Institute is very much interested is that with Venezuela, which is now being considered by the Department of State. The Institute has joined with other interested parties in asking that the subject of fuel oil importations from Venezuela be not discussed, for if this were done it would preclude Congress from changing the present duty on Venezuelan oil, which now amounts to one-half cent per gallon. Both the domestic oil industry and the solid fuel interests hope to see that figure increased.

The Interstate Commerce Commission on March 8, 1938, granted the railroads permission to increase the freight rates on anthracite 10 cents per net ton. The Pennsylvania Public Service Commission refused to allow any increase in the intra-state rates on anthracite, but on the petition of the carriers the I. C. C. ordered proportionate increases to be applied in the State. The Pennsylvania Commissioners have considered taking the matter to court, but as this is written a compromise is being discussed.

An open price filing agreement was entered into by a majority of the anthracite producers early in 1938, whereby they agree to keep on file in New York the prices, terms of sale, and sales policies applied by the producer in connection with all sales. Any changes in these items are reported immediately and transmitted to all other signatories to the agreement. At first the agreement was administered by a committee, but since April 16 it has been handled by the engineering management firm of Stevenson, Jordan & Harrison.

Heavy Compensation Rates Under New Act

Revision of the State Workmen's Compensation Act by the Pennsylvania Legislature in 1937 went into effect on January 1, 1938, as did a new law which made occupational diseases compensable. A committee of operators studying these changes estimated that the compensation cost to the industry, which in 1937 approximated $2,500,000, would eventually amount to $7,500,000 annually under the amended act. As a result a substantial majority of the producing companies rejected the Act as of January 1, as the law permitted, but announced they would voluntarily settle with all claimants on the basis of the law as operated in 1937. Claimants not accepting this offer can resort to common law for settlement.

Progress in COAL RESEARCH and TECHNOLOGY*

By ARNO C. FIELDNER
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and
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THE year 1938 was marked by increased interest in research and its application to the production, preparation, and use of coal. Bituminous Coal Research, Inc., continued to support research at Battelle Memorial Institute and Pennsylvania State College; Anthracite Industries, Inc., enlarged its research on appliances for burning anthracite at the Anthracite Research Laboratory, Primos, Pa., and on new uses for anthracite at the Mellon Institute; and coal producers combined with consumers in raising funds to continue the work of the Coal Research Laboratory at the Carnegie Institute of Technology for four more years.

The anthracite industry initiated a forum for the discussion of new developments in the utilization of anthracite by holding a conference at Lehigh University. The meeting was well attended and a second conference will be held this year.

Outstanding in promoting the application of research to coal utilization have been the fuel engineering conferences by Appalachian Coals, Inc. These meetings have created keen interest among fuel engineers of the producing, consuming, and general interest group. The subjects discussed have been of timely interest, and J. E. Tobey, who has managed these meetings, is to be congratulated on their success.

During 1938 increased attention was given to studies on the constitution and physical properties of coal in relation to combustion, carbonization, and hydrogenation. Size-consist, size-stability, segregation of sizes in bins, sampling, dustiness, retention of moisture, grindability, agglutinating and agglomerating values, and plasticity and expanding properties have been investigated in a number of laboratories, and progress has been made in

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developing tests for determining some of these properties.

Constitution, Classification, and Testing of Coal

The death of Dr. Reinhardt Thiessen is a great loss to research on the microstructure and origin of coal. Fortunately, his work is being continued by others at several institutions. The Bureau of Mines recently published detailed instructions for the preparation and microscopic examination of samples of coal as developed under Dr. Thiessen's direction. The Illinois Geological Survey, Pennsylvania State College and the Bureau of Mines published results of research showing important relations between petrography and the characteristics of coal with respect to the preparation, hydrogenation and carbonization.

Committee D-5 on Coal and Coke of the American Society for Testing Materials recommended a new tentative method of sampling coals classed according to ash content. This method is applicable to ordinary commercial sampling of coal and is designed to have such accuracy that in 95 instances out of 100 the ash content of the sample will be within plus or minus 10 percent of the true ash content of the coal. The Sectional Committee on the Classification of Coals recommended tentative standard definitions for commercial varieties of coal such as common banded coal, splint coal, and boghead coal. Standardization of these definitions completes the work of this committee. It has submitted standards for the classification of coal according to rank, grade and variety or type.

The need for chemical and physical data on the price classification of coal by the National Bituminous Coal Commission led to a greatly enlarged program of sampling and analysis of the various sizes of coal shipped at different mines. This work was done by laboratories supported or employed by the District Coal Producers Board and by the Bureau of Mines. An account of the work of the latter will be published and will enlarge the fund of knowledge available on the properties and composition of American coals. Size-consist, friability, and grindability have been determined in many instances, in addition to the usual proximate and ultimate analyses, heating value, and ash fusibility.

It is beginning to be realized that the sizes and distribution of sizes in coal are important in connection with its efficient utilization. In many instances size is the most important single factor. Several papers were published as a result of studies on segregation of sizes in storage bunkers and on the prevention of such segregation.

Preparation

The Battelle Memorial Institute developed a new launder-type coal washer. It is fitted with means for supplying vertical currents of water through construction plates to closely spaced refuse draw valves at the bottom of the stream to increase mobility in the bed and thereby reduce the length of launder required.

Following several years of research, the Du Pont Company announced the successful application of high-density liquid organic compounds to the cleaning of coal. Pentachlorethane or other halogenated hydrocarbons are employed as the float-and-sink separating bath. The particular feature of the process that makes for economic success is the use of wetting agents which cause a film of water to adhere to the surface of the solid particles and thus prevent loss of the relatively expensive organic liquid which otherwise would adhere to the cleaned coal and refuse. Another new process, applied in Holland, uses ground magnetite or pyrite sinter in water suspension to simulate a high-density float-and-sink bath similar to the Chance sand flotation process.

Although a few plants installed dedusting systems primarily to obtain consumer preference, there continued to be some difficulty in disposing of the dust, so removed, at a profit. Studies on allaying dustiness were continued by several laboratories, and the results and experimental study of oil treatment published by the Battelle Memorial Institute showed that oil-treated coal could be stored six months without any increase of dustiness and that the viscosity of the oil used is important in obtaining maximum dust prevention with a minimum amount of oil.

Operators of wet cleaning plants showed growing interest in the nature and distribution of water in coal and in methods for determining inherent and extraneous water added in the washing plant. In the control of dewatering and drying processes as well as in studies concerning the effect of surface moisture on the screening, handling, and freezing properties of coal, it is desirable to know the amount of surface moisture present. Research on this subject is being pursued in various countries.

Combustion Research and Technology

Research on the performance of different kinds and sizes of coal in domestic stokers was conducted by Bituminous Coal Research, Inc., at the Battelle Memorial Institute, by the University of Illinois, Iowa State College, the Bureau of Mines and others. These studies have shown that the plastic properties of coal must be considered in selecting a coal for a given type of stoker, and likewise that the optimum size-consist of different coals for stoker use is important in obtaining satisfactory operation. One investigator reported high efficiency for stoker-fired boilers, compared to those fired with gas or oil, due to the residual heat in the hot fuel bed in the off periods. Some consumers have commented on the contribution of this factor to more constant temperatures in homes.

There has been increased interest in more intelligent selection of coal to fit its uses. Further advancement depends upon the ability to relate more closely the measures of coal character-

—Anthracite Industries, Inc.

Research on perfecting coal combustion is proceeding rapidly, but more is sorely needed

istics with actions in fuel beds and with plant requirements.

The Detroit Edison Company has conducted an extended investigation on the possible uses of and markets for fly ash collected in electrostatic and cyclone precipitators. The most promising uses are related to the building industry—Cottrell blocks with 90 percent fly ash, cinder concrete in which fly ash replaces sand, pebble concrete and as a filler in asphalt paving.

The use of forced-draft spreader stokers increased, coals ranging from anthracite to subbituminous in rank having been burned successfully.

Hydrogenation of Coal

The Bureau of Mines now has in operation an experimental, continuous hydrogenation plant having a capacity of 100 pounds of coal per day. Detailed data on the primary liquefaction by hydrogenation of Pittsburgh bed, Illinois No. 6 and Colorado subbituminous coals were obtained during the year. The Fuel Research Laboratory of the Canadian Department of Mines recently published the results of tests on eight Canadian and one English coal. These tests were made in a continuous plant similar to the one used by the United States Bureau of Mines.

Research on the use of pulverized solid fuel in Diesel engines was continued in Germany. Some favorable results were obtained by using the pulverized organic matter free from ash obtained by extracting coal with organic solvents under pressure. The principal handicap of coal-dust engines is erosion of the cylinder walls by ash particles; consequently, any scheme that separates the combustible matter of coal from the ash is favorable for the production of Diesel engine fuel.

Sales of Coal Mine LOADING EQUIPMENT*

By L. N. PLEIN† J. J. GALLAGHER M. van SICLEN F. G. TRYON

SALES of mechanical loading equipment for use in coal mines declined in 1938, but at a rate much less than the drop in production. Whereas the total output of all coal—anthracite and bituminous—fell off 107,000,000 tons, or 22 percent, sales of mobile loading machines declined by 17.5 percent, and sales of conveyors by only 9.6 percent.

Declining prices and the increased wage scales effective since April 1937 have stimulated the effort to reduce costs by mechanization. In 1938 the savings resulting from new installations of loading machinery appear to have been more than offset by the effects of low running time, which tends to cause a sharp increase in per ton costs. Mine managers continued to seek economies, however, and the number of loading units purchased was greater than in any earlier year of equally low production. As stated by Julian D. Conover, Secretary of the American Mining Congress, the coal industry "is taking its rightful place as one of the progressive industries which apply modern American methods in the production of one of our great natural resources."

Total Units Sold by Type

The number of mobile loaders sold during 1938 was 241, as against 292 in 1937 and 344 in the peak year 1936. Despite the decrease, the sales of 1938 were far above those of the years from 1933 to 1935, in which production was actually higher than in 1938. Sales of scrapers, on the other hand, fell off very sharply to the lowest point covered by the record. Sales of conveyors, though below 1937 and 1936, were much above any preceding year. The figures for conveyor units include both hand-loaded types and those equipped with duckbills or other self-loading heads. The number of duckbills cannot be shown separately without disclosure of individual business, but it may be said that they are finding acceptance in many new fields. The total of 990 conveyor units also includes equipment purchased for use in conjunction with mobile loaders and therefore not destined for hand loading. It is estimated from manufacturers' reports that at least one-tenth of the conveyors sold to bituminous mines was for use in performing transportation functions in back of mobile loaders. Conveyors intended for transportation in haulage ways or slopes are not included.

A feature of the year was an apparent renewal of interest in the pit-car loader, sales of which rose from 32 in 1937 to 139 in 1938. In fact, the 1938 sales exceeded the total for the entire five years preceding. This machine, which represents the simplest type of mechanization of loading, was installed in great numbers between 1926 and 1930 in fields of Indiana and Illinois. Only a few of the 1938 sales went to Illinois, however, and five-sixths of the year's shipments were made to West Virginia, where hitherto the pit-car loader has found little use.

TABLE 1.—UNITS OF MECHANIZED LOADING EQUIPMENT SOLD TO BITUMINOUS AND ANTHRACITE MINES AS REPORTED BY IDENTICAL MANUFACTURERS, 1933 TO 1938, INCLUSIVE.*

	1933	1934	1935	1936	1937	1938	Percent increase (+) or decrease (—), 1938 over 1937
Mobile loaders	41	55	115	344	292	241	— 17.5
Scrapers †	65	34	22	28	29	10	— 65.5
Conveyors ‡	396	610	681	994	1,095	990	— 9.6
Pit-car loaders	18	26	28	11	32	139	+334.4

* The figures for 1933 to 1936 included reports from 28 manufacturers. In 1937 one manufacturer indicated that he was no longer producing this type of equipment and accordingly was dropped from the active list; however, at the same time another manufacturer was added to the list, and the number of reporting firms remained at 28. In 1938 a manufacturer of material handling machinery began the production of underground loading equipment and the number of reporting firms is now increased to 29.

† Reported as scrapers or scraper haulers and hoists.

‡ Includes hand-loaded conveyors and those equipped with duckbills and other self-loading heads. A considerable number of these in 1936 to 1938 were for use in conjunction with mobile loading machines.

* This report is made possible by cooperation of the Works Progress Administration National Research Project on Reemployment Opportunities and Recent Changes in Industrial Techniques, and is published by permission of the Director of the project and by permission of the Director of the Bureau of Mines.

† Messrs. Plein, Gallagher, and Tryon are members of the Research Division of the National Bituminous Coal Commission. Mr. van Siclen is Chief Engineer, Coal Economics Division, U. S. Bureau of Mines.

As in earlier years, American manufacturers of loading equipment sold a few machines to Canadian and Australian mines. These exports, however, are not included in the present statistics.

The trends of sales are shown graphically in Figure 1. The scales in this figure are so arranged as to give a rough indication of the relative importance of the several types of equipment in terms of tonnage capacity. It will be seen that the largest additions to capacity in 1938 continued to be made by the mobile loaders, followed by conveyors, with or without self-loading heads. On the other hand, additions to capacity resulting from scrapers are small, as are also those from pit-car loaders, despite their sudden increase in 1938. The dotted lines in Figure 1 represent total deep-mined production. Since practically all mobile loaders and pit-car loaders are used in bituminous mines, the charts for these two types show bituminous deep-mined output only. For scrapers and conveyors, total anthracite and bituminous deep-mined output is used.

Source of Information.—These figures are based upon returns courteously supplied by all known manufacturers of loading machinery for underground use in coal mines. The number of reporting firms is identical from year to year and the figures may be accepted as directly comparable.

Total Sales by States

Shipments of mechanized loading devices of one type or another were made to 18 states in 1938. In some cases it is not possible to show the number of machines of each type sold in each state without disclosing the business of individual manufacturers; therefore, Table 2 has been prepared to indicate the total number of units shipped to each state or region. The kinds of machines sold are indicated by letters—L for mobile loaders, S for scrapers, P for pit-car loaders, and C for all types of conveyors. The several types are arranged in the rough order of the capacity shipped into each area in 1938. Thus, for the State of Illinois, a total of 72 units is shown, followed by the letters "L, P, and C," indicating that the highest capacity was in the form of mobile loaders, followed by pit-car loaders, and conveyors. Nearly all of the conveyors shipped to this State were for use in conjunction with mobile loaders.

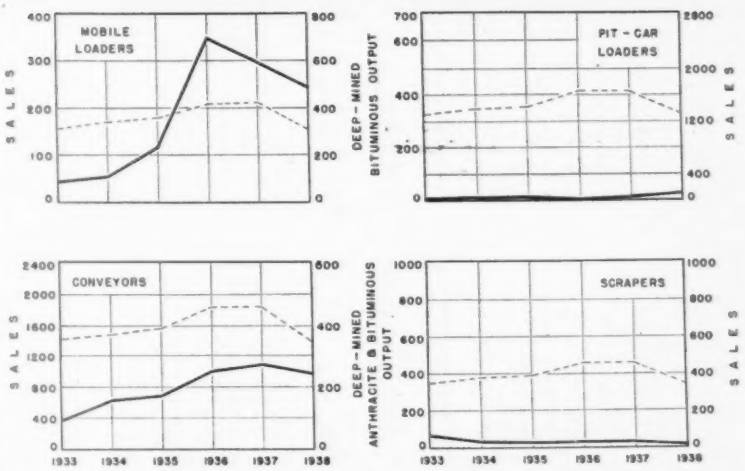

Fig. 1. Number of underground loading devices sold for use in coal mines, 1933 to 1938. Solid lines—loading devices; dashed lines—coal output. Conveyor figures include those equipped with duckbills and other self-loading heads. For comparison, total bituminous deep-mined output, in millions of tons, is shown with mobile loaders and pit-car loaders; and total anthracite and bituminous deep-mined output with scrapers and conveyors.

TABLE 2—TOTAL NUMBER OF UNITS OF MECHANIZED LOADING EQUIPMENT SHIPPED FOR USE IN EACH STATE OR REGION IN 1938.

(L=Mobile loading machines. P=Pit-car loaders. S=Scrapers. C=Conveyors, including those with duckbills.)

	No. of units of all types shipped in 1938	Types of equipment in approx. order of capacity
Northern Appalachian:		
Pa. and Md.	99	L, C
Ohio	38	L, C
Southern Appalachian:		
West Virginia	531	L, C, P, S
Virginia	14	L, C
Kentucky	133	L, C
Alabama	69	C, L, S
Tennessee	21	C, L
Middle Western:		
Illinois	72	L, P, C
Indiana	9	L, C
Trans-Mississippi:		
Ark. and Okla.	46	C, L
Iowa and Mo.	8	C, S
Colorado	40	C, L
Utah and Mont.	49	L, C
Wyoming	11	C, L
Total bituminous	1,135	L, C, P, S
Pa. anthracite	245	C, S
Grand total	1,380	L, C, P, S

TABLE 3.—SALES OF MECHANIZED LOADING EQUIPMENT IN 1937 AND 1938 COMPARED WITH TOTAL NUMBER OF MACHINES IN ACTIVE USE IN PRECEDING YEARS

	Number of machines in active use, as reported by mine operators								Number of machines sold as reported by 29 manufacturers	
	1929	1930	1931	1932	1933	1934	1935	1936	1937	1938
Bituminous mines:										
Mobile loading machines	488	545	583	548	523	534	657	980	292	241
Scrapers	126	150	146	128	93	119	78	106	13	6
Pit-car loaders	2,521	2,876	3,428	3,112	2,453	2,288	2,098	1,851	32	139
Conveyors equipped with duckbills and other self-loading heads	99	140	165	159	132	157	179	234	†835	749
Hand-loaded conveyors—number of units	*	*	*	*	525	574	670	936		
Anthracite mines (Pennsylvania):										
Mobile loading machines	350	384	5	11	18	14	1	504	...	...
Scrapers			457	479	455	517	507		16	4
Pit-car loaders			28	24	19	25	22		...	...
Conveyors equipped with duckbills and other self-loading heads	355	421	1	17	12	13	30	1,790	†260	241
Hand-loaded conveyors—number of units			547	818	940	1,338	1,563			

*Number of units not reported in these years.
† Reported as face conveyors (hand-loaded), "shaker drives," and "duckbills." The figures of numbers sold in 1937 and 1938 are not exactly comparable with the number in use in 1936, because of uncertainties in defining what constitutes a conveyor.

Units Sold Compared to Units in Use

The changing demand for the different types of loading equipment is shown in Table 3. The number of mobile loaders in active use as reported by operators of bituminous mines increased from 488 in 1929 to 980 in 1936. Final statistics of the number in use in 1937 are not yet available. However, the sales made in 1937 and 1938 equalled 54.4 percent of the number actually in use in 1936. Because of uncertainties in defining what constitutes a conveyor, the record of current sales is not fully comparable with the record of number previously in use, but the fact of a large increase is clear, particularly in bituminous coal mining.

The number of scrapers sold is now small, measured against the numbers previously installed. The number of scrapers in use reached its peak in the bituminous fields in 1930 and in the anthracite fields in 1934.

Regional Distribution of Mechanized Capacity

For some years the proportion of the underground output obtained by mechanical loading has been highest in the coal fields of the Northern Rocky Mountains and of the Middle West, where high wage rates, combined with favorable seam conditions, had stimulated the process of mechanization. In some fields of these areas underground loading is now almost entirely mechanized and the rate of installations of new equipment has therefore tended to slow down. In the last three years, market conditions and the trend of wage rates have tended to stimulate mechanization in the Appalachian region, and by far the greater part of the shipments of new equipment in 1938 went to the coal states of the East and South.

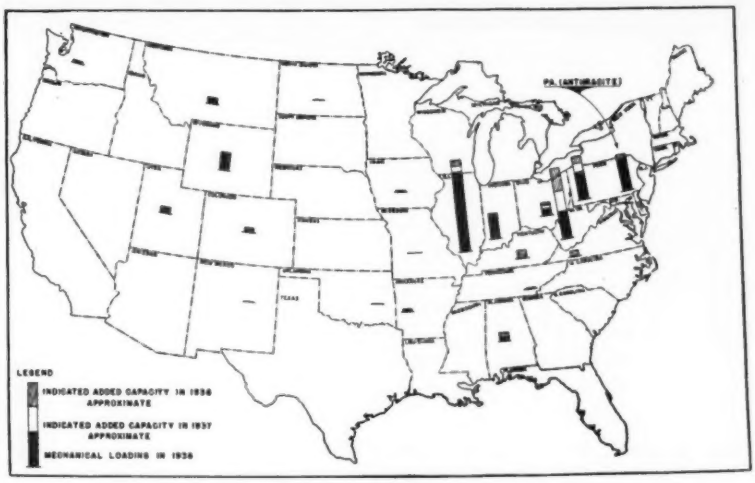

Fig. 2. Tonnage mechanically loaded in 1936 and approximate capacity of new equipment shipped in 1937 and 1938

Figure 2 shows in a generalized form the regional distribution of sales in relation to pre-existing capacity. The diagram is the roughest of approximations. Accurate figures for the actual tonnage mechanically loaded in 1938 must await the publication of final statistics based upon returns from the operators. In the meantime, however, the map indicates the areas where sales of equipment have been most active. The height of the columns is not intended to represent the tonnage loaded in 1938, but to indicate the relative loading capacities between states.

By far the largest installations of mechanical loading equipment in recent years have been made in West Virginia. In 1935, only 2.1 percent of

TABLE 4.—COMPARISON OF MOBILE LOADERS, SCRAPERS, AND CONVEYORS IN ACTUAL USE IN 1936 WITH SALES REPORTED IN 1937 AND 1938, BY REGIONS

	Mobile loaders			Scrapers			Conveyors [a]		
	In use in 1936	Sales in 1937	Sales in 1938	In use in 1936	Sales in 1937	Sales in 1938	In use in 1936	Sales in 1937	Sales in 1938
BITUMINOUS									
Northern Appalachian States:									
Pennsylvania	92	23	47	31	...	...	366	105	52
Maryland	...	...	...	...	...	...			
Ohio	47	28	15	...	...	...	18	37	23
Southern Appalachian States:									
Alabama	10	7	[b] 39	27	5	2	64	64	64
Kentucky	5	18		11	...	...	35	106	98
Tennessee		1			1	...	21	38	20
West Virginia	126	73	80		5	3	196	275	332
Virginia	9	8	9	...	1	...	70	16	5
Middle Western States:									
Illinois	431	81	[c] 38	...	...	...	7	19	20
Indiana	146	31		...	...	...			
Trans-Mississippi States	[d] 114	[e] 22	[f] 13	[g] 37	[h] 1	1	[i] 393	[j] 175	[k] 135
Total bituminous	980	292	241	106	13	6	1,170	835	749
ANTHRACITE									
Pennsylvania	...	...	...	504	16	4	[l] 1,790	260	241
Grand total	980	292	241	610	29	10	2,960	1,095	990

[a] Includes hand-loaded conveyors and conveyors equipped with duckbills or other self-loading heads. The figures of number in use in 1936 are not exactly comparable with the number sold in 1937 and 1938 because of uncertainties in defining what constitutes a conveyor. The comparison, however, will serve to indicate which regions have made the largest proportionate increases. [b] Mostly in Kentucky. [c] Mostly in Illinois. [d] Includes Colorado, Montana, New Mexico, North Dakota, Utah, and Wyoming. [e] Includes Arkansas, Montana, Utah, and Wyoming. [f] Includes Colorado, Montana, Oklahoma, Utah, and Wyoming. [g] Includes Arkansas, New Mexico, Oklahoma, and Wyoming. [h] Wyoming. [i] Includes Arkansas, Colorado, Iowa, Montana, Utah, Washington, and Wyoming. [j] Includes Arkansas, Colorado, Iowa, Utah, and Wyoming. [k] Includes Arkansas, Colorado, Iowa, Oklahoma, Utah, and Wyoming. [l] Includes a few pit-car loaders.

the State's output was loaded mechanically, either directly or with the aid of conveyors. In the first 10 months of 1938, according to the State Department of Mines, this proportion had increased to 20.3 percent. Thus far, however, the large scale installations of mechanical loading have been chiefly confined to the districts of the State where seam conditions are most favorable to mechanization, particularly in Northern West Virginia and in selected portions of the southern high-volatile section. Thus, over 77 percent of the output of Monongalia County and over 46 percent of that of Logan County are now loaded with the aid of mechanical devices. A significant development of 1938 was the rise of mechanical loading in the West Virginia Panhandle. In the Smokeless fields, on the other hand, the percentage mechanically loaded is still small.

TABLE 5. NUMBER OF BITUMINOUS COAL MINING COMPANIES PURCHASING NEW MECHANIZED LOADING EQUIPMENT IN 1937 AND 1938*

	Buying mobile loaders		Buying conveyors†	
	Companies that used mobile loaders in 1936	Companies that did not use mobile loaders in 1936	Companies that used conveyors in 1936	Companies that did not use conveyors in 1936
Northern Appalachian States:				
Pennsylvania	4	23	7	9
Maryland	..	..	2	..
Ohio	3	7	2	7
Southern Appalachian States:				
West Virginia	16	25	6	28
Virginia	2	5	2	1
Kentucky	2	24	3	20
Tennessee	1	1	2	7
Alabama	1	3	2	6
Middle Western States:				
Illinois	16	6	1	4
Indiana	5	4	..	1
Trans-Mississippi States:				
Arkansas	..	1	3	7
Colorado	1	1	4	11
Iowa	..	..	..	1
Montana	1	1	..	..
Oklahoma	..	2	..	6
Utah	4	..	2	6
Wyoming	2	..	4	..
Total bituminous	58	103	40	114

* Covers the business of all but two manufacturers in 1937 and all but one in 1938. In addition, 15 companies bought scrapers, of whom two used scrapers in 1936 and 13 did not.

† Includes conveyors equipped with duckbills and other self-loading heads, and hand-loaded conveyors other than pit-car loaders.

Types of Equipment Purchased in 1938 by Regions

Table 4 shows the number of units shipped into each state or area, insofar as the information can be published without revealing confidential information.

Eighty loaders were sold in West Virginia, chiefly in the Northern West Virginia and Panhandle districts, with smaller numbers in the southern districts, both low and high volatile. Forty-seven mobile loaders were sold in Pennsylvania, chiefly in the western district. Nine loaders were sold in Virginia and 39 in the three remaining Southern States of Alabama, Tennessee, and Kentucky. Of these, by far the largest number went to Kentucky, the sales being about equally divided between the eastern and western districts of the State.

The largest market for conveyors was also found to be in the Southern fields. Total sales of all types of conveyors, including those equipped with duckbills, in the Southern Appalachian States increased from 499 units in 1937 to 519 in 1938. In the Northern Appalachians and the Far West purchases of conveyors declined.

Number Companies Buying Loading Equipment

The number of coal operating companies using mechanical loading equipment continued to expand in the last two years. The companies installing loading equipment for the first time in 1937 and 1938 were approximately double the number who merely added equipment similar to the kind which they had already been using in 1936. This is shown by Table 5, which analyzes the shipments of 26 manufacturers in 1937 and 28 in 1938. Though not complete, the records of these manufacturers indicate the trend. West Virginia, Kentucky and Pennsylvania led in the number of new companies taking up mobile loading; and West Virginia, Kentucky, and Colorado led in new conveyor trials.

SULPHUR Output Declines 13 Percent*

● *Price Reduction and Increased Byproduct Production Feature Year's Events*

By ROBERT H. RIDGWAY
Metal Economics Division
U. S. Bureau of Mines

SULPHUR is employed widely in the arts and industries. It is not surprising, therefore, that consumption of this basic commodity follows in general the curve of industrial production and that the industry did not experience as good a year in 1938 as in 1937.

Probably the most significant event of the year was the reduction in the sulphur quotations announced at the beginning of the last quarter. The price was reduced from $18 to $16 per long ton at the mines, while the ex-vessel quotation along the Atlantic seaboard was reduced to $20.50 per ton from the former price of $22 at all ports except Boston, Mass., and Portland, Me., where the price was $22.50. Increased charter and transportation costs apparently prompted the change from $4 to $4.50 per ton in mine and Atlantic coast quotations. This was the first change in sulphur quotations since early in 1926.

Maintenance of the price at $18 a

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Loading sulphur from stockpile at Hoskins Mound, Tex., operation of Freeport Sulphur Co. Note drilling rigs on top of pile—distinct from oil derricks beyond

long ton through good years and depression has made this market attractive, and technical investigations into sulphur production as well as researches for substitutes and substitute processes have resulted, with some success.

Byproduct Output Increases

Apparently pressure resulting from increased byproduct sulphur production as well as additional domestic production of native sulphur from newly developed deposits was not without effect on the changes in the sulphur quotations. The export markets have been invaded by byproduct sulphur produced in rather large quantities in foreign countries. In Norway, for example, output for the five years ended in 1937 averaged about 65,000 tons per year. Previously there had been no production of sulphur in Norway, and the necessary supply was imported. This output, made in the treatment of cuprous pyrites, comes from one plant where capacity has been doubled during the last year. Likewise, Germany, formerly a good market for American sulphur, in recent years has developed a considerable byproduct sulphur production from the treatment of industrial gases and is now nearly self-sufficient in sulphur. Aside from these operations, plants for the recovery of sulphur have been constructed during the past few years in Canada, Portugal, Spain and Sweden.

As a raw material for sulphuric acid production, native sulphur long has had to compete not only with pyrites but with the sulphur content of other base-metal sulphides, as byproduct sulphuric acid production has resulted from the treatment of zinc and copper sulphine ores. Now, however, a new source of sulphuric acid appears to be resulting from the treatment of oil refinery and natural gases to remove hydrogen sulphide. Several processes have been developed, and plants are in operation for the conversion of hydrogen sulphide to sulphuric acid. The cost of acid from this source is said to be less than that from other sources. This is particularly significant, for the oil-refinery industry is the second largest consumer of sulphuric acid in this country.

Domestic Production Off 13 Percent

The total domestic production of native sulphur in 1938 was about 13 percent below that in 1937, despite the advent of a new producer. Shipments, however, decreased more (35 percent), resulting in an increase in the stocks of mined sulphur, already large. The output for 1938 is estimated at 2,390,000 long tons, with shipments at 1,625,000 tons.

Of interest to the domestic producers during 1938 was the action taken on the sulphur severance tax in Louisiana. In 1936 the tax was raised to $2 per long ton compared with $1.03 in Texas. State legislation passed in 1938 provided for a reduction in this figure to conform with the rate in Texas. For the Louisiana operator this will go part way toward offsetting reduction of the price quotation, and on the strength of the tax reduction program the Freeport Sulphur Company made certain construction and improvements, including a sulphur purification plant, on its operating location at Grande Ecaille, Plaquemines Parish.

In Texas, the Freeport Sulphur Company continued to produce at Hoskins Mound, Brazoria County, while the Texas Gulf Sulphur Company operated at Boling Dome, Wharton County, and Longpoint Dome, Fort Bend County. Other producers in Texas were the Jefferson Lake Oil Company and the Duval Texas Company. Output at Clemens Dome, Brazoria County, which was started in 1937, is reported by the former company to have reached 1,000 tons a day during part of 1938. At this rate the new operation alone is making more sulphur than the entire output of Italy, the world's second largest producer. Aside from its output on certain tracts at Boling Dome, Wharton County, the Duval Texas Company started production from Orchard Dome in Fort Bend County.

Further researches by the leading domestic producers have been carried on with a view to broadening the applications for sulphur. Utilization in fertilizers, insecticides, lubricants, plastics, sulphur cements, road-building compounds, jointing mediums, impregnants, sulphur pipe and sulphur-lined pipe is indicated, but to date no large tonnage outlet has been developed.

POTASH and PHOSPHATE ROCK*

By BERTRAND L. JOHNSON
Non-metal Economics Division
Bureau of Mines

THE destinies of the potash and phosphate rock industries still rest predominantly with the farmers, although chemical engineers are calling for increasing amounts of phosphate. The cash income of American farmers, after rising each year for five consecutive years, fell in 1938 by about a billion dollars. Following an abnormally large fertilizer consumption in 1937, and reflecting the lower prices received by the farmers and the reduction in their income, fertilizer consumption turned downward in 1938, following a five-year rise. In the heavy fertilizer using states, the income of farmers is reported to have held up better than the national average. The 16 South Atlantic and South Central States take about 70 percent of the total national fertilizer tonnage consumed. In 1938, in these States alone, with decreased cotton acreage and decreased farm income, fertilizer consumption dropped nearly 600,000 tons, 11 percent from the tonnage of the preceding year. Declines in consumption of potash and phosphate rock naturally accompanied the drop in use of fertilizer.

Potash

In the domestic potash industry in 1938 deliveries, domestic sales, exports, and imports all appear to have been less than in 1937. Total sales of domestic potash for the entire year 1938 in both domestic and foreign markets are estimated on the basis of figures for 11 months to have been about 8 percent less than the 266,938 tons actual K_2O sold in 1937.

Operations of potash plants in the United States are said to have been curtailed in 1938 as a result of cancellations of orders early in the year and a reduction of sales during the summer. The principal producers were the American Potash & Chemical Corporation at Trona, Calif., and the United States Potash Co., Inc., and The Potash Co. of America, operating near Carlsbad, N. Mex. Several hundred tons of potassium chloride were produced from the natural saline brines of the Salduro Marsh, in extreme western Utah, by the Bonneville, Ltd., Wendover, Utah. These brines are reported to have been a source of potash during the World War. Experimental work was carried on by this company in 1936 and 1937, and production and shipments made in 1938. The Union Potash & Chemical Co., of New Mexico, in which the International Agricultural Corporation has an interest, was granted three Government leases and resumed shaft sinking. The potash deposits are expected to be reached early in 1939. The principal product of the company is to be potassium sulphate.

On May 18, 1938, the Senate passed a resolution extending for another two years the time in which the subcommittee of the Senate Committee on Public Lands and Surveys may submit the report on its investigation of the domestic potash industry. This gives the committee until the expiration of the 76th Congress to file its report.

In February 1938 the Bureau of Mines issued Report of Investigations 3386, Compression Tests on Roof Salt Slabs Supported by Potash Salt Pillars, by H. P. Greenwald and H. C. Howarth, a study of roof behavior at the faces of the potash pillars left in mining operations in the horizontally bedded potash deposits of the Carlsbad region, New Mexico.

Although the potash plants in California and New Mexico are stated to be able, if need be, to supply the entire domestic needs of potash salts, large quantities of potash are still imported, such amounts having declined in 1938 to about half of those in 1937.

Exports of domestic potassic fertilizer materials, however, appear to have declined much less, shipments abroad during the first 11 months of 1938 having dropped about 19 percent.

During the year American producers formed the Potash Export Association to facilitate foreign sales of domestic potash, and papers were reported to have been filed with the Federal Trade Commission, under the Webb-Pomerene Act, for exporting potash salts.

Headframe at operation of U. S. Potash Co., Carlsbad, N. Mex.

Phosphate Rock

Domestic consumption of phosphate rock in 1938 was less than in 1937; imports were small, as usual, but exports were greater. Much less phosphate rock was used in the production of superphosphate, the principal use, in 1938 than in 1937. Production of superphosphate in each of the first 11 months of 1938 was less than in the corresponding month of 1937, and for the 12 months ended November 30, 1938, the total production of bulk superphosphate in the United States was only 3,676,365 short tons compared with 4,376,229 tons in the 12-month period ended November 30, 1937. A corresponding decline in the consumption of phosphate rock in superphosphate production is indicated.

Mining operations were in progress in Florida, Tennessee, Virginia, and in the West as usual. Resumption of mining operations in the South Carolina phosphate fields in 1938 is reported and a small tonnage mined and exported. The lowering of the commercially utilizable grade of phosphate rock by recent technologic improvements in the manufacture of phosphoric acid and elemental phosphorus by electric furnace methods below the average grade reported for South Carolina phosphate rock would appear to suggest reconsideration of these deposits for future exploitation. The trend toward increased chemical utilization of phosphate rock continued in 1938 with the completion and opera-

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tion of two new electric furnace plants—that of the Phosphate Mining Co. at Nichols, Fla., and that of Victor Chemical Works at Mountpleasant, Tenn., in the brown-rock phosphate field.

Exports of phosphate rock from the United States in 1938 will remain above a million tons. Exports of hard rock were above those of 1937. Exports of land pebble for the first 11 months were above those for the corresponding period of 1937, and it is expected that the total for 1938 will exceed that for 1937.

Tonnage production of elemental phosphorus by the Monsanto Chemical Co. in its Tennessee plant has made available pure, dry phosphorus pentoxide in such quantities that the price in carload lots has been lowered from 18 cents to 12 cents a pound, this cut of a third possibly opening the way to increased utilization of this product. Monsanto has also introduced a tetrapotassium-pyrophosphate for commercial use as an addition agent for shampoos, textile oils, and soaps.

Government Investigations

The various Government activities in connection with the domestic phosphate rock industry drew widespread public interest, these having been launched along three separate lines—the investigation of the adequacy of the reserves by one joint Congressional Committee; the investigation of the operations and activities of the Tennessee Valley Authority by another joint Congressional Committee; and the operations of the T. V. A. itself.

The President, on May 20, 1938, sent a special message to Congress, calling attention to the heavy drain on the then supposedly limited phosphate reserves of Florida and Tennessee by current operations while the large reserves of the Western States were comparatively undeveloped and recommending the appointment of a joint congressional committee to study the "entire subject of phosphate resources, their use and service to American agriculture, and to make a report to the next Congress."

As a direct result of this message, a joint congressional resolution authorized an extended investigation by a joint committee of the Senate and House headed by Senator Pope (Idaho) the committee to report on or before February 15, 1939. Anticipating formulation of a comprehensive program for the conservation and development of the Nation's phosphate resources as a result of this study, Secretary Ickes on July 2, 1938, ordered suspension until further notice of all activities in connection with the granting of phosphate mining leases on the public domain. Previously, however, the Director of the Bureau of Mines had advised against hasty action to curtail exports in the interest of conservatism, pointing out the serious damage that thereby would be done to the mining industry. Hearings by the joint Congressional committee have already been held in Washington, D. C.; Pocatello, Idaho; Knoxville, Tenn.; and Lakeland, Fla. Data submitted to the committee already indicate that the phosphate reserves in Florida may be revised upward to a magnitude of possibly 2½ billion tons instead of the 546,000,000 tons formerly believed to be there, enough to last at least 600 years at current rates of consumption.

The other joint Congressional Committee has been investigating the activities and operations of the Tennessee Valley Authority, meetings having been held in Washington, D. C., and in Knoxville, Tenn. A report of the findings of an interdepartmental committee appointed by the Secretaries of Agriculture and of the Interior in response to a request of the joint Congressional Committee on the Investigation of the Tennessee Valley Authority, was released November 9, 1938.

T. V. A. developments continue, with a new full-scale unit for the production of crude calcium metaphosphate (contains 60-65 percent phosphorus pentoxide) from phosphorus and rock phosphate at Wilson Dam now in regular production.

SAFETY in the Mining Industry*

●*Number of Accidents Reduced Materially, But Lower Production Resulted in Probable Increase in Accident Rate*

By D. HARRINGTON
Chief, Health and Safety Branch
Bureau of Mines

IN THE first half or possibly the first two-thirds of 1938 mineral production, including coal but excluding gold, was decidedly low and, again excluding gold, the total output of the various minerals for the year is likely to be 20 to 50 or more percent (depending on the individual product) less than in 1937. This automatically lowers the number of accidents, including fatalities, in mining; unfortunately, however, there is reason to believe that the accident *rate* was not lowered but probably showed a fairly definite increase, though even tentative figures for mine-accident occurrence in 1938 are available only for coal.

Accident Record in Coal Mining

Table 1 indicates that the estimated coal output for 1938 (385,700,000 tons) was "off" more than 100,000,000 tons from the estimated 494,200,000 tons for 1937 and that the number of coal-mine fatalities was but 1,128 (estimated) in 1938 against 1,412 (tentative) in 1937; however, the tentative fatality rate per million tons mined in 1938 was 2.92 against 2.85 (also tentative) in 1937. The increased fatality rate is not encouraging, but even so it is significant that the tentative coal-mining fatality rate of 2.92 for 1938 is much lower than was ever achieved by the coal mines of the United States prior to 1933, and the 2.92 rate is also about the same as for 1934 (2.93) and for 1935 (2.925).

Inspection of Table 2 indicates that since 1930 much progress has been made in reducing the number of fatalities as well as the fatality rate; the reduction in the fatality rate was especially marked in the years 1933-38, inclusive, although the upward trend since 1933 and especially in 1937 and 1938 is distinctly in the wrong direction.

Table 2 shows very well the much-decreased rate of fatal accidents in the

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coal mines of the United States in the past five-year period (2.92 in 1938, 2.85 in 1937, 2.73 in 1936, 2.925 in 1935, and 2.93 in 1934) as against the rates in the five-year period 1906-10 (5.27 in 1906, 6.78 in 1907, 5.97 in 1908, 5.73 in 1909 and 5.62 in 1910). These figures indicate a decrease of almost 50 percent in the fatal-accident rate of the past five years compared with similar rates for the five-year period 1906-10.

TABLE 2.—FATALITIES AND FATALITY RATES PER MILLION TONS OF COAL MINED, 1906-1938, INCLUSIVE.

Year	No. fatalities (anthracite plus bituminous)	Deaths per million tons coal produced
1906	2,138	5.27
1907	3,242	6.78
1908	2,445	5.97
1909	2,642	5.73
1910	2,821	5.62
1911	2,656	5.35
1912	2,419	4.53
1913	2,785	4.89
1914	2,454	4.78
1915	2,269	4.27
1916	2,226	3.77
1917	2,696	4.14
1918	2,580	3.80
1919	2,323	4.19
1920	2,272	3.45
1921	1,995	3.94
1922	1,984	4.16
1923	2,462	3.74
1924	2,402	4.20
1925	2,234	3.84
1926	2,518	3.83
1927	2,231	3.73
1928	2,176	3.78
1929	2,187	3.59
1930	2,063	3.84
1931	1,463	3.31
1932	1,207	3.36
1933	1,064	2.78
1934	1,222	2.93
1935	1,242	2.925
1936	1,342	2.73
1937	1,412*	2.85*
1938	1,128*	2.92*

* Tentative as estimated January 4, 1939, by W. W. Adams, Employment Statistics Section, Bureau of Mines. These figures are likely to vary but slightly from the final figures, which will not be available for several months.

In metal mining and quarrying definite figures on accident occurrence are not available for 1938, but Table 3, containing the latest available data, indicates that since 1930 or 1931 a definitely downward trend is noticeable in the accident rates of both metal mines and quarries, though further reduction of the accident rate has apparently been *"stalled"* in metal mining as well as quarrying in the past few years.

TABLE 1.—COAL MINE FATALITY RATES, UNITED STATES, 1930-38 INCLUSIVE

Year	(Fatality rate per million tons) Bituminous	Anthracite	Combined	Fatalities	Total Tons
1930	3.46	6.40	3.84	2,063	536,911,136
1931	2.83	6.42	3.31	1,463	441,750,978
1932	3.09	4.99	3.36	1,207	359,565,093
1933	2.50	4.66	2.78	1,064	383,171,877
1934	2.65	4.69	2.93	1,222	416,536,313
1935	2.60	5.24	2.925	1,242	424,632,005
1936	2.52	4.46	2.73	1,342	491,138,762
1937	2.70*	4.15*	2.85*	1,412*	494,200,000*
1938	2.64*	5.08*	2.92*	1,128*	385,700,000*

* Tentative as estimated January 4, 1939, by W. W. Adams, Employment Statistics Section, Bureau of Mines. These figures are likely to vary but slightly from the final figures, which will not be available for several months.

TABLE 3.—ACCIDENT RATES IN METAL MINES AND QUARRIES, IN THE UNITED STATES, 1911-38, INCLUSIVE

	Metal mines, killed and injured per thousand 300-day-workers (calculated)	Quarries, killed and injured per thousand 300-day workers (calculated)
1911-15	202.38	91.58
1916-20	245.04	162.39
Avg. 1911-20, incl.	224.36	123.84
1921-25, incl.	276.27	175.22
1926-30, incl.	213.22	140.77
1926	248.48	162.15
1927	224.64	164.55
1928	208.11	131.41
1929	203.14	129.79
1930	170.78	109.76
1931	142.09	106.04
1932	138.46	97.33
1933	155.13	97.59
1934	163.17	91.18
1935	152.86	86.23
1936	176.71	92.32
1937	*	95.12
1938	*	*

* Not available.

Chart 2 shows how the number of fatalities decreased from the average of 531 annually for the period 1911-25 inclusive to 95 in 1933, 116 in 1934, 164 in 1935 and 199 in 1936 (the last year for which definite figures are available). Chart 2 also shows that since reaching the *"low"* in 1933, there has been a gradual but none the less disturbing increase in the number killed in metal and nonmetallic mineral mines during late years and more particularly in 1935 and 1936.

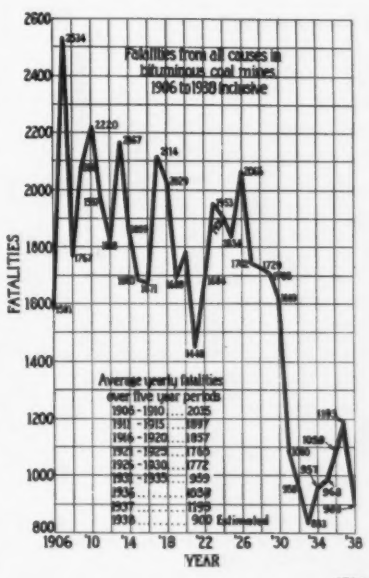
Major Disasters

The occurrence of six major disasters in the coal mines of the United States, with a total of 84 fatalities, in 1938 and of six in 1937, with 101 deaths, is disquieting coming at it does after a period of four years, 1933-36, when there was an average of but three major disasters with 25 deaths per year. The trend is unmistakably in the wrong direction. There were no major disasters in metal mines in 1938, but there was one in a tunnel under construction when 10 persons were killed in blasting and another in a quarry with six deaths, also caused by blasting. Blasting in fact was responsible for three of the six major disasters in coal mining, making its 1938 record decidedly poor. In addition, there were numerous asphyxiations, especially in metal mines, caused by blasting fumes and numerous deaths or very severe accidents caused by drilling into missed holes and similar causes. Some progressive rules and regulations with regard to avoidance of accidents and ill health from blasting fumes were adopted and put into effect in California and New York. The blasting-fume problem has been acute in Ontario, Canada, also, and some new regulations have been drafted by a commission.

Dust Problem Maintains Attention

The dust problem has not been so prominently before the mining industry as in the past, yet it continues to exercise considerable attention from commissions and committees and probably will be discussed rather actively in

Chart 1



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legislative sessions during the early weeks of 1939. Many metal-mining companies are doing intensified dust prevention and dust sampling to be prepared for whatever may transpire in connection with legislative action on this subject; this seems to be a common-sense thing to do. Some progressive coal-mining people (both anthracite and bituminous) are carefully scrutinizing available data on air dustiness and on methods available for minimizing its harmfulness on both the health and safety sides. In some bituminous regions there is much increased interest in watering and other methods to reduce mine dustiness, with the three-fold object of preventing ill health, reducing the explosion hazard, and avoiding the material reduction of visibility at working places that accompanies excessive air dustiness which impairs safety and efficiency.

Effect of Machinery on Safety

Several agencies are studying the effects of the increased use of machinery in our mines, coal and metal, with regard not only to costs, efficiency, and production but also to safety. Studies of a similar nature are also being made in other countries, and in December 1938 the British Royal Commission on Safety in Coal Mines issued its report after several years of taking testimony. The report indicates that while mechanized mining has new hazards compared with those of the more primitive "hand" methods, by using available precautions it can be conducted at least as safely as the older systems, and if carefully planned practices are instituted it may even be safer than the older systems. This is also the opinion of some people who have made intensive studies of the subject in the United States. Nevertheless, mechanized mining has caused in one manner or other some of the worst accidents of recent years in the coal mines of the United States; especially does this apply to mine explosions and fires, and in 1938 a major disaster was caused by a roof fall at a mechanized face. The night shift in mechanized coal mines in 1938 as well as in 1937 is charged with 50 to 100 deaths, and unquestionably the night shifts should be "watched."

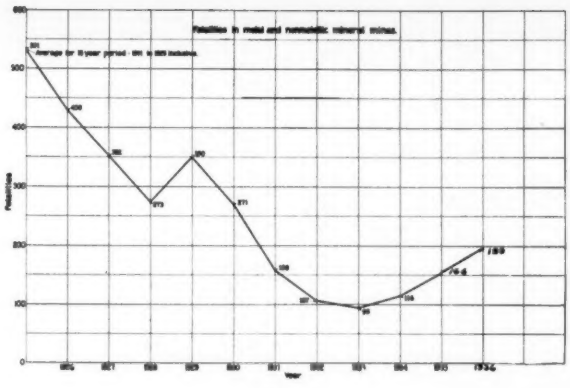

Chart 2

Encouraging Events

While 1938 gave relatively little encouragement on the whole to those deeply interested in promoting safety in mining, there were some bright spots to relieve the drabness of the record. The Joseph A. Holmes Safety Association at its 1938 meeting gave merit awards to 43 individual coal-mine workers who had worked in coal mines 50 or more years without a lost-time accident. Coal mines in Utah operated the first 11 months of the year without a fatality and worked the entire year with but one fatality. Coal mines of Alaska, Michigan and Texas had no fatalities during at least the first 11 months of the year. Monthly statements of the mine inspection departments of several States list numbers of coal mines that have produced around or over 1,000,000 tons of coal without a fatality. Metal mines of the United States went through the year without a major disaster. The coal-mine rock-dusting method operated for the protection of workers in several instances where explosions of gas or dust (or both) were started, and unquestionably aided materially in saving several hundred lives in 1938 alone. Black blasting powder has been almost eliminated from West Virginia coal mines. Alabama's coal mines have adopted the use of electric cap lamps almost 100 percent. One more coal-mining State is now requiring in a limited way the use of permissible electrical equipment.

Summing up, so much progress of a fundamental nature in safety procedure has been made in 1938 that notwithstanding the numerous discouraging features as to accident occurrence during the year, careful consideration of the good along with the bad might well cause the investigator to arrive at the conclusion that after all the year 1938 probably promoted the ultimate advancement of safety in mining.

Proper equipment and well trained men are vital factors in promoting safety

Review of the INTERNATIONAL SITUATION with special reference to CENTRAL EUROPE*

By JOSEPH S. McGRATH
Chief, Foreign Minerals Division
Bureau of Mines

THE statistical position of minerals and their primary products during 1938 deserves secondary consideration in any review of the world situation because the major political events of the year, more than ever before, had a very definite influence upon world production, international trade, and price trends. Economic devices that were governmentally inspired and administered, such as exchange controls, quota restrictions, production-consumption controls, export-import license requirements, bilateral trade agreements, and barter trade, which were adopted a few years ago by so many countries, in many instances were applied more rigidly and extensively during 1938. Government control, regulation, or supervision of the mining industry generally, including the production, trade, and consumption elements, throughout the world became more pronounced in 1938 than at any time since the Industrial Revolution, not excepting the World War period, when national defense dictated stringent control of national resources.

Developments during 1938 in the Mexican oil situation which resulted from the law relating to expropriation of foreign petroleum companies; the economy plan imposed by the Japanese Government in June 1938 which provided for price fixing, compulsory use of substitute materials and drastic control of domestic consumption; the disturbed internal conditions throughout the year in Spain and China; Germany's annexation of Austria, and the acquisition by Germany, Poland, and Hungary of the most valuable mineralized areas of Czechoslovakia—these represent outstanding but by no means all events of 1938 that definitely affected world production of and international trade in sizable tonnages of a diversified group of essential, and in most instances strategic, mineral raw materials.

Space permits only a summary of the Central European situation during 1938 with emphasis on the mineral wealth gained by Germany, Poland, and Hungary at the expense of the former republics Austria and Czechoslavakia.

German Mineral Gains Through Annexation of Austria

To facilitate its drive toward self-sufficiency, what did Germany gain in mineral wealth when on March 13, 1938, a decree was issued declaring Austria to be a State of the German Reich? At that time in consequence of the World War, Austria had already lost many important mining districts to Czechoslovakia, Yugoslavia, Poland, and Italy. Like Germany, Austria had depended largely upon its export trade to furnish the means for obtaining the required deficient mineral products. However, unlike Germany, where the very opposite attitude is an outstanding feature of its "Four-Year Plan," Austria made no serious effort to replace essential imports by substitute materials or to develop low-grade domestic mineral deposits.

Iron Ore, Magnesite, Graphite and Ferro-Alloys Cited

Austria for some years has produced an exportable surplus of iron ore, magnesite, graphite, and talc. Iron ore production of nearly two million tons in 1937 can without doubt be more than doubled. One of the most difficult barriers Germany has to hurdle in its drive toward self-sufficiency is the inability to obtain an adequate supply of iron ore from domestic sources. In 1937 Germany imported 20,620,876 metric tons and during the first 10 months of 1938, 18,490,820 tons; the 1938 figures indicate clearly Germany's dependence upon foreign sources of supply, since Austria's output after March 1938 was considered "of domestic origin." However, the iron ore reserves of Austria probably represent the most valuable mineral asset that Germany acquired. Not unimportant, moreover, was the acquisition of Austria's magnesite deposits; the annual output has for years maintained Austria in the position of world's largest producer of this mineral, thus assuring Germany of virtual self-sufficiency of this material. With reference to graphite, Germany apparently has also become self-sufficient through acquisition of Austria's resources. Germany's imports of pig iron and ferro-alloys in 1937 were slightly less than Austria's total output, and it can be assumed that these items may disappear from the tables of essential German imports.

Reich Mineral Gains from Czech Partition Held Minor

What economic advantages that involve mineral wealth were gained by Germany through annexation in October 1938 of the Sudeten areas in the provinces of Bohemia and Moravia, Czechoslovakia? The Czech Republic, which came into existence in October 1918, inherited over four-fifths of the industrial resources of the former Austro-Hungarian Empire, including the lead-silver, iron ore, coal, lignite, and radium mines of Bohemia, the iron ore and oil fields of Slovakia, and the coal mines of Silesia.

The economic advantages to Germany resulting from partition of Czechoslovakia are as yet questionable. The heavy industries, especially the Skoda armament works—the largest in Europe outside of Germany—remain just inside the Czech frontier. However, about 94 percent of the lignite produced annually and about 12 percent of its coal output have been lost to Germany by Czechoslovakia. Germany's acquisition of the lignite and coal deposits in northwest Bohemia

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is of little economic importance as there was already within Germany a sufficiency of both. Czechoslovak lignite deposits are, however, of much higher grade than German "brown coal;" in fact, three tons is considered equivalent to two tons of bituminous coal.

In addition to the lignite and coal resources lost by Czechoslovakia, the State-owned radium mine at Joachimstal, Bohemia, and the high-grade china clay deposits, together with virtually all the china and porcelain plants of western Bohemia, now belong to Germany. It seems probable that china clay may thus disappear from the list of essential German imports.

In brief, the mineral wealth gained by Germany through annexation of the Sudeten and Austrian areas is of minor value in the efforts being made by Germany to achieve self-sufficiency. The additional territory gained makes more pronounced Germany's present day deficiencies in the non-ferrous metal group and in non-metallics, especially petroleum products.

Although Sudeten territory lost by Czechoslovakia may be considered relatively unimportant to German economy, the comparatively smaller area of about 400 square miles acquired by Poland represents a gain of paramount importance to Polish national economy.

Poland Won Important Coal and Steel Industries in Teschen Area

The acquisition by Poland in November, 1938, of Trans-Olzan Silesia, or the Teschen area, a highly industrialized region containing high-grade coking-coal deposits and extensive iron and steel plants, undoubtedly will result in far-reaching benefits to the country. The predominant industries of this area are coal mining; the manufacture of iron, steel, and other metals, chemicals, and clothing; and the preparation of lumber—about 2,800 separate enterprises in all. About 75 percent of the coal and 40 percent of the steel produced by former Czechoslovakia came from this area.

Of the various branches of Polish industry that will benefit from the annexation of Trans-Olzan Silesia, coal mining and the iron and steel industry will gain most, the former increasing its annual output by 25 percent and the latter by 55 percent in pig iron and 50 percent in steel. The domestic market can absorb a fair proportion of the increase in coal, and there is reason to believe that Trans-Olzan coal will probably retain some of its export markets. The iron and steel industry will benefit primarily by the acquisition of a domestic source for excellent coke. Poland has had under consideration extensive investments in the iron and steel industry, and plans were made some time before the partition of Czechoslovakia to equip the Polish industry to the point where it could meet the needs of national defense. The acquisition of the Trans-Olzan Silesia steel plants automatically satisfied Poland's most pressing needs in this regard and enabled national efforts to be deflected toward expansion of the metal-manufacturing industry—a vital necessity to the country.

Hungary Gained Minor Amounts Iron and Lignite

The Hungarian-Czech frontier was settled finally on November 2, 1938, by a court of arbitration composed of German and Italian representatives. The area lost by Czechoslovakia was about 4,200 square miles and is considerably less important as a source of mineral raw materials than the territories acquired by Germany and Poland. After the World War, Czechoslovakia acquired from Hungary iron mines that produced about 725,000 metric tons of ore annually; Hungary's recent acquisition of Czech territory involves the return to Hungary of mines producing approximately 234,000 metric tons of iron ore. Production at these mines has for years been discouraged by the Czech authorities, and it appears certain that output can be increased considerably.

Hungary regains the lignite or brown-coal basins in the former frontier where it is reported production was allowed to decline when the territory was a part of the Czech Republic. As Hungary already had ample reserves of lignite but imported large tonnages of bituminous coal and anthracite, the increase in lignite resources is of little importance.

The economic effects of the annexation of Austria and the Sudeten area upon German national economy, in so far as mineral wealth is concerned, while undoubtedly beneficial, will not to any great extent facilitate Germany's drive toward self-sufficiency. The gains made by Poland through the partition of Czechoslovakia are far more important to Polish national economy than those made by either Germany or Hungary. Although production of the few minerals available in the district ceded to Hungary can be stimulated, it is unlikely that maximum recovery of the mineral wealth in this area will prove to facilitate the progress of Hungarian industry. With reference to minerals and the major consuming industries thereof, except for the armament works in Pilsen, Prague, and Brno that are within the reconstructed Czech border, it may be said that present-day Czechoslovakia is practically devoid of mineral resources and will have to depend almost entirely on imports to maintain the industrial plants remaining within its frontier.

Mine Security Registration and Recommendations for Improving Procedure*

Report of the AMERICAN MINING CONGRESS COMMITTEE on COOPERATION with S. E. C.

By SAMUEL H. DOLBEAR
Committee Chairman

IT IS my pleasure to submit herewith a report of the Committee on Cooperation with Securities and Exchange Commission relating to the registration of securities of mining concerns.

Appointment of this committee was authorized by the Board of Directors of the American Mining Congress at Denver in October, 1936, in response to a demand that a study be undertaken as to possible means of reducing the burden of registration by mining companies.

The committee has examined the record and comment of a considerable number of registrants to whom it is indebted for liberal assistance and helpful suggestions.

The committee is also grateful for the ready cooperation of various officials of the Securities and Exchange Commission who have freely discussed these problems and have supplied much useful information.

The committee believes that the fundamental purpose of the Securities Act and its administration should be to protect the investor against fraud and misrepresentation. It believes that it is possible to accomplish this end without impairing the capital market for legitimate mining ventures. The committee considers that at present its administration imposes oppressive and needless burdens which should be remedied administratively in so far as that can be done under the present act, or if the present law does not permit of such correction, then appropriate change should be made in the law itself.

It is recognized that the writing of a law and the development of organization, rules, and practices best suited to accomplish the desired objectives is a monumental task requiring trial and error and much time. It is believed that much may be accomplished by the cooperation of industry with those charged with the administration of the law, and it was with this purpose in mind that your committee was brought together.

There have been various conferences with officials of the Securities and Exchange Commission, and we can say without reserve that we have always found a sincere desire to cooperate with the efforts of this committee and an earnest interest in learning what representatives of the mining industry feel could improve the work of the Commission.

It cannot be denied that much remains to be desired and much to be done.

The first effect of the passage of the Securities Law was to immediately wipe out of existence those fanciful promotions of the J. Rufus Wallingford and George Graham Rice type.

Complicated Requirements

The work of the Commission, however, often deals with less flagrant types of promotions, particularly those characterized by half-truths and omissions. The fundamental problem seems to be that in a desire to prevent fraudulent or fanciful promotions, a complex mass of rules and exactions have been and are being built up to be applied to all cases. So involved, complicated, and extended are these rulings and requirements that it is doubtful if even the members of the Commission or members of the staff devoting their entire time to this subject are able to keep track of them all. This makes a situation which is very difficult for anyone to meet who is not devoting his entire time to mastering this great volume of rules and decisions which have been and are being created. If this is the necessary requirement of the present law, we believe the law should be changed to permit of simpler procedure. If

* Presented to Metal Mining Convention of the American Mining Congress, Western Division, Los Angeles, Calif., October 24, 1938.

simpler procedure is possible under the present law, then administrative action should be taken promptly to accomplish that end.

The Matter of Omissions

There is no question that the law was intended to and should prevent, so far as possible, false and fraudulent promotions. One real difficulty seems to come in dealing with omissions. Undoubtedly, omissions may in some cases have the effect of definite misrepresentation. In other cases, however, omissions are simply reflections of the impossibility of endeavoring in a brief statement to set forth all known facts. In other cases, the statement of relatively immaterial facts may make them seem to have a materiality which is contrary to fact. The setting up of a complex mass of rules and exactions to be applied in all cases is almost certain to give a lack of proper perspective in many cases. Furthermore, requirements to furnish exact statements of information that no one concerned with the venture considers to be of material importance in passing upon its merits, entail work and expense which pass the bounds of reason. Intelligent judgment, rather than multiplicity of rules, seems required.

The committee submits herewith its findings and recommendations, based upon the study of numerous cases. These have included a range extending from feeble beginnings to large companies whose securities are dealt with on the large exchanges and the registrations of which involved many millions of dollars.

Its findings represent cross-sections of opinions and experience of a large number of registrants and are frankly critical. It is the hope of the committee that these findings, although inescapably critical, shall be considered constructive.

Findings and Recommendations

1. It is essential that it should be recognized that the mining industry presents many problems not common to manufacturing and other industries, and that registration of mining companies should be treated by experienced officials with a thorough knowledge of these differences.

2. The adoption of a large number of rules and regulations has made registration unnecessarily complex and difficult of compliance.

3. Form A-0-1 has not proved to be satisfactory for the registration of new mining concerns, and requires revision.

4. There are many instances in which decisions or rulings of one official of the Commission have been reversed or changed by another official. This practice has led to needless confusion, delay, and expense.

5. The cost of registration in a large number of cases is excessive. It is believed that in many new promotions a substantial part of the available capital has been consumed in costs incurred in the course of registration.

6. The time required in preparation and registration is, in most cases, excessive. There are numerous examples, in both large and small registrations, in which the delay has interfered with or prevented successful financing.

7. The feeling is general among registrants that the attitude of the Commission is unsympathetic and unfriendly, and that registration is attended by needless obstacles, overmeticulous decisions, and overexacting requirements may, in part, be responsible for such feeling. These, in turn, may be traceable to a lack of adequate knowledge of problems peculiar to the mining industry on the part of some of the personnel of the Commission.

8. The requirement of extensive disclosure in the prospectus appears to defeat its own object. It is believed that the average investor is certain to be confused by the mass of material, much of which only serves to obscure the statement of essential facts of the enterprise.

9. It appears to the committee that there has been a too frequent resort to stop-order proceedings. Such proceedings usually impose a heavy financial burden on the registrant. No useful purpose seems to be served in the application of these proceedings prior to effective registration. Except in cases where fraud or malignant evasion is clearly indicated, the registrant should be permitted to substantiate or correct its statements by amendment, with more adequate time allowed for the preparation and filing of amendments.

10. Of necessity, in quasi judicial proceedings the Commission acts both as an investigator and judge. There have been many instances where parties appearing before the Commission in such proceedings feel that there has been an unreasonable attitude of hostility toward the registrant. Without desiring to deter reasonable cross-examination, the committee suggests that the Commission adopt a policy of impartiality and fairness toward registrants at all times, thereby increasing public confidence in the fairness of its rulings. The committee also recommends that parties who feel that they have been prevented by the Commission's procedure from fairly presenting their case should have a fuller opportunity than is granted by the Securities and Exchange Act to obtain judicial review not only of the Commission's orders and findings but of its procedure. To that end, if it appears that the Commission's attitude toward a registrant or its rulings on the admission or exclusion of evidence have been improper, the courts should be authorized to hear the witnesses themselves and pass on the evidence instead of merely reviewing a typewritten record. In view of the fact that the Circuit Court of Appeals, which now has the reviewing jurisdiction, is an appellate tribunal not equipped to take or receive evidence, this would probably necessitate a reference to the District Court for the taking of evidence and making the findings on any case where the Circuit Court of Appeals may deem that such a trial de novo is warranted in the interests of justice.

11. In addition to registration with the Securities and Exchange Commission, qualification is also required under various state laws. With due recognition of the difficulty of effecting a reconciliation of Federal and state powers, the committee feels that there is urgent need of cooperative endeavor to avoid duplication or conflicting requirements.

12. Exemption from registration is now available for those *seeking* amounts less than $30,000 and $100,000 under certain conditions. In view of the fact that many of the smaller promotions, while seeking larger amounts, actually realize less than the amount of exemption, it is recommended that the requirement to register be applied only when the exempted amount has actually been raised. This procedure would relieve the potential applicant from burdensome registration costs until such time as it is in a financial position to meet them.

13. The Commission has attempted to set up its own standard as to what constitutes sound engineering practice. Your committee recommends that the Securities and Exchange Commission seek advice on these matters from outside its own organization and suggests for this purpose the designation of a technical advisory committee, to be made up of engineers of recognized standing approved or designated by the American Mining Congress acting

jointly with the American Institute of Mining and Metallurgical Engineers.

14. Some cases have been noted, particularly among the smaller registrations, where statements have undoubtedly been carelessly prepared. Registrants are advised to give well-thought-out answers to questions and careful attention to the rules of procedure.

Your committee believes that a registration statement which will emphasize essential requirements and do this within a compass which can reasonably be read and understood by the ordinary man will help to correct this situation, and also believes that the emphasis on points of practical value and importance to the investor will tend to give better-considered answers to the questions. If the registrant can see the materiality of the questions he is required to answer, he will be in a better position to give adequate answers to them.

15. It is recommended that a division of mining be established within the Commission with authority over the issues of mining companies, and that its responsible head be a mining engineer of experience and recognized standing.

The VIEWPOINT of the S. E. C.

PROCEDURAL PROBLEMS

By BALDWIN B. BANE
Director, Registration Division
Securities and Exchange Commission

EVER since my arrival I have been asked for a copy of my address. When I come out among mining men I don't want to make an address—I want to talk. I want to try to explain certain ideas that we have, certain ideas back of this legislation.

I want to admit that we have made mistakes. I want to admit that things are not as perfect as they might be. But I don't think, in starting off, that we get very far towards correcting those mistakes when you simply say, for instance, that Form A-0-1 is imperfect. Certainly it is imperfect. But how? It doesn't help to say, for instance, that the Commission is unfriendly to mining, because it isn't true. I deny it. We get nowhere with that kind of thinking and talking. To say that we are setting up standards of our own for mining implies what? It is bound to imply that we are setting up standards differing from those that the competent and honest men in the industry have. That is not so. It has been said that the average man who comes before us in a mining situation can't get information, that he is told to "go to so-and-so" or that he has "to hire so-and-so to tell me." I have been with this Act from the beginning. There has never been a person come to the Commission with any question under the Act who didn't get an answer.

BALDWIN B. BANE

Make out your form for you? We can't do that. We don't know the facts. However, if you come in with any specific questions, we are glad to attempt to answer them. We devote 12 or 14 hours a day attempting to answer them through interviews and by letters. If anybody is telling you that he has come to the Commission and that there has been no attempt to answer his questions, he is telling you something that isn't so. I don't care what the question is, we will attempt to help you with it. Sometimes we may answer it wrong, but we will give you our best ideas on the particular problem you have. As I say, some of us spend 12 to 14 hours a day doing just that.

I want to get these bugaboos out of the way. When this Act was passed, two or three types of act were presented. One was an act which set up a board, a body, or a commission, whatever you want to call it, in Washington, that could say definitely you can't offer this or you can't offer that, it was uneconomical to offer this or it was economical to offer that. That was passed over. I don't think you want in Washington any five or six men with such power.

Act Requires Telling Truth of Offering

Instead of that, there was passed an act which required you to do just one thing, and that was to tell the truth about what you were offering. You are not to try to sell a cotton shirt as a silk shirt. That is all that is attempted to be done. Process too complicated? Maybe so. Too many rules? Maybe you are right. But you should help develop them. We don't get anywhere by simply saying there are too many rules and too complicated a form. Tell us wherein they are wrong.

You have talked about the time you have consumed in getting an issue effectively registered. Twenty-six mining statements have been filed since January 1, 1938. Every one of those 26 had a letter, a letter of deficiencies, suggesting amendments that should be made, mailed to the registrant within an average time of nine days. The average time of reply to those letters was 28 days. Now who is taking time? Those are the facts.

Those registration statements for mining companies which contain the material information concerning the particular enterprise, presented in accordance with the requirements of the form upon which the statement is filed, or which are promptly and properly amended, become effective without undue delay.

Most Statements Filed Deal With Prospects

Conservatively I think 90 percent of the mining statements filed with us are for ventures in the nature of prospects, primary mining ventures. It is our job to see that they are presented as such. And that is an awfully difficult job sometimes, as you well know.

One mining engineer represented that there was a certain amount of proven ore in a particular property. When we questioned the representation, we learned that a shaft had been sunk on the property and that drifts along the vein had been driven for about 300 feet at two different levels about 100 feet apart. In both of these drifts pockets of commercial ore had been found, the vein in between such pockets being utterly barren. This engineer had taken the average grade of ore found in these pockets, applied it to the total volume between the drifts, and concluded there was that much proven ore of such grade. When that representation was objected to on the ground that the known facts would not support his conclusion, and the matter came to me, he objected to my agreeing with the criticism because I was not a mining engineer, though a mining engineer originally made the criticism. You don't have to be a mining engineer to know that the plums are not the total volume of the plum pudding.

Letter of Deficiencies Important to Registrant as Well as Investor

Most every mining issue that has come before us I think has had some responsible people connected with it. This Act puts a civil liability—correctly, I think—on those who sign the registration statement and on all the board of directors. If we sat there, accepted the statements and let them become effective as filed, what would we have? Most likely a great many lawsuits all over the United States. There are relatively few registration statements filed that do not require correction in some way or other. Maybe our forms are inadequate. But we are not going to get anywhere with this legislation if a large number of the filings simply result in lawsuits. As far as we can, let's obviate that possibility. Let's tell the registrant what we feel should be disclosed. The letter of deficiencies is just as valuable for the registrant and its officers and directors as for the investors to whom you are going to try to sell the stock. The letter of deficiencies, in my opinion, is the thing that makes the Act work.

We have found that evils in connection with mining securities were being perpetrated not only mine-wise through over-valuation, unfair sampling, and the like, but also security-wise, with respect to capitalization, underwriting, method of distribution, and other factors common to all securities. It has been not uncommon for us to make no criticism of the presentation from a mining point of view but to discover careful and subtle misrepresentation on, say, security-holders' rights or promoters' profits. We are so organized that every mining filing undergoes joint examination by mining experts and by men familiar with the creation and marketing of all types of securities, both mining and non-mining.

Should Aim at Simplicity

The thing, in my opinion, that we should aim at is simplicity. If the forms are too complicated, let us work out simpler forms. Suggest to us a simpler form for mining. We may not adopt it entirely, but we will seriously consider it and certainly adopt some of it.

Mr. Dolbear started off by saying that you don't get cooperation. I would like to ask him if he ever came to the Commission and asked a question that an attempt wasn't made to answer it for him? Did he ever come there for any information at all that wasn't voluntarily and gladly given to him? I will venture to say he never asked a question that he didn't get answered—he never asked for any assistance that he didn't get.

We have a lot more to learn. Go to Salt Lake City, Spokane, Seattle, San Francisco, or Denver, and pick out the leading underwriters or the leading dealers and you will find they do not handle mining issues. Why? They are in the midst of mining districts. I think that we may to some extent help to correct that.

Will Welcome Constructive Criticism

Your objectives and ours are the same. It may be that our forms are too complicated and that we have too many rules. How many of you saw and had an opportunity to criticize Form A-0-1 before it was adopted? Your committee did. We got your advice on it. Now don't simply tell us it is bad. Don't simply say "You are doing this and you are doing that wrong." Tell us wherein and why you think we are wrong and you will find sympathetic and receptive consideration. We will welcome any constructive criticisms that you wish to make.

ENGINEERING PROBLEMS

By HOWARD N. LARY
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Securities and Exchange Commission
Denver, Colo.

HOWARD N. LARY

LOS ANGELES, a city harboring many conflicting social philosophies, forms an excellent background for the discussion today on the subject of mineral exploration and development financing under the Securities Act of 1933 and the Securities Exchange Act of 1934. I wish to thank your committee, which by prearrangement submitted its report to me the latter part of September of this year. Your Congress is to be praised, for such an arrangement permits a more comprehensive consideration of this controversial subject.

Because those of us here are by training, vocation, or association vitally interested in mining and its future, because we speak its language and because we look upon its problems through much the same glasses, I feel that despite our obvious disagreements as to practice, we are entirely in agreement as to the ultimate objective. We want to see the mineral resources of this country intelligently, economically, and thoroughly exploited. We want to see an exploration or development project go to the public for

necessary funds with success and without suspicion. We want to see an orderly process of exploration, development, and exploitation with a minimum of Government control or supervision. Today your committee says that present controls, in so far as they pertain to mine financing, and I shall use that phrase instead of mineral exploration and development financing through this talk, are oppressive and needless burdens as administered. It is my opinion that such controls are not oppressive, that they are necessary, and that their enforcement will eventually benefit the industry whose spokesmen presently condemn them. It is my further opinion that the industry cannot long survive in its present form without them unless there arises in the industry itself an effective system of self-control that adopts the code of financial ethics outlined in this legislation.

The report is disappointing to me both as an officer of the Commission and as a mining engineer, for it shows, despite the efforts of your committee over a period of two years when it has availed itself of the "liberal assistance and helpful suggestions of registrants" and the "ready cooperation of various officials of the Securities and Exchange Commission," that in their minds reconciliation of the various problems is no nearer today than it was in Denver two years ago.

Desires Specific Criticism

My only criticism of the report is that it is too general. I had hoped that the findings which are described as "inescapably critical" would be more specific. In other words, I had hoped that your committee would report, for instance, that Form A-0-1 was unsatisfactory because the answers to items 18 and 25 must be set forth at the beginning of the prospectus, or because item 34A required a statement of the weight or volume of proven ore if the issuer claimed any proven ore, or for other reasons. I had hoped that specific illustrations would be given of difficulties caused issuers in their efforts to comply with the laws. I had even hoped that suggested revisions might be included in this report. Had your committee done this, it would now be possible to discuss each disagreement and try to find a common ground.

I do feel, however, that a start has been made, for now the various criticisms have been assembled and placed on record. It is unfortunate that your committee reported so generally, for otherwise I am sure that some progress could be made. On some points, however, there appear to be fundamental differences of opinion.

There are two basic charges in this report. They state generally that procedure under the present laws is complicated and burdensome and that the administrative agency is unfriendly and unsympathetic.

These two charges may be further simplified into one. That charge is registration, for every finding or criticism by your committee may be reworded into the statement that registration is a burden to the registrant. Some consider it to be impractical, complicated, time-consuming, expensive, or unnecessary, and others consider that the Commission in its duties has been unfair, uninformed, meticulous, equivocal, and unfriendly.

Section 5 (a) of the Securities Act of 1933 states generally that unless a registration statement is in effect it shall be unlawful to use the instrumentalities of interstate commerce in the original sale of a security. Sections 6, 7, and 8 of the same act relate generally to formal requirements and Commission procedure in so far as they pertain to registration. The constitutionality of this provision has been repeatedly tested and repeatedly upheld.

Registration has but one objective; namely, the full and fair disclosure of all material facts. It is primarily an instrument prepared by the registrant for the use of investors, although a condensation called a prospectus is generally used. Briefly, this requirement is based on a principle that the simple standards of trusteeship demand a high standard of financial morality as the price of confidence.

Return From Added Cost

Despite the fact that registration does add a burden, its cost is not entirely lost to the registrant. First, it reduces unfair practices in competition for capital; second, it reduces the possibility of subsequent civil and criminal proceedings by immediately raising the question of materiality; and third, it often discloses material information unknown even to the registrant. Such benefits are only of value to the person or persons who wish to be trustees in fact.

Charges directed at the Securities Act of 1933 or its complementary rules and regulations have been the subject of many discussions since the law became effective. Briefly, it was passed because of the widespread demand for a form of investor protection and it was so drafted.

Matter of Exemptions

The rules and regulations pertaining to this law deal for the most part with formalities applicable to all or many types of issues. The $100,000 exemption requires a minimum of information while the $30,000 exemption is a further exemption from even these minimum formalities. Their adequacy is questioned by your committee in a manner that answers itself in part, for the issuer is permitted to exhaust his exemptions before registration. Since stock, however, issued for cash, property or services, is issued for value received, there can be no discrimination. Any course of action such as your committee suggests, attracting as it would any number of fraudulent schemes, would only defeat the purpose of exemption. An exemption from registration for mining issues until $100,000 had actually been received by the issuer would make it a playground for every larceny expert in the country, and no bona fide issuer could hope to compete. Under present exemptions, conditions are troublesome enough, and each year issuers of mining securities availing themselves of these exemptions always incur more civil or criminal liabilities than issuers who register. Many feel, because they can avoid registration, that the Commission has no jurisdiction. This is not true, for sections 12 (with a single exception) and 17 acknowledge no exemptions. Actually, the exemptions from registration were placed there for the purpose of providing simple methods for local purposes.

It was and is intended that nation-wide or large-scale issues of securities should be registered. Due to the many schemes that have already been designed to circumvent registration, there appears little likelihood that exemptions will be modified unless the Commission requires more instead of less information. A clear and comprehensive statement of the law, rules and regulations as they apply to mine financing was presented by Day Karr, regional administrator at Seattle, before the Mining Association of Montana, and I shall be glad to see that copies are available to all who wish them.

Other criticisms of legal procedure are beyond the scope of my subject, but the general charges of unfairness and incompetence of administration are not.

Unfairness Charge Answered

The charge of unfairness has two answers. First, any person finds laws and their administration unfair if they dispute his personal standards of freedom of action. This happens in all actions to which the Commission is a party. The second is that human relationships are such that opposing standards in controversies often give rise to transient ill feeling which in some cases, due to permanent restraints imposed on some lucrative racket, is translated into a general charge of unfairness and unfriendliness. From personal observation I can only say that the Commission and its Registration Division have given more patient thought to the problem of promotional securities than any other type of original issue. It must, however, always consider both the rights of the issuer and the investor, and for that reason will probably continue to be charged with many shortcomings by both for a long time to come.

Defends Engineering Standards

On the subject of competence, it is charged that the Commission has "attempted" to set up its own standards of what constitutes sound engineering practice. It is suggested that engineers possessing that exclusive characteristic designated as "recognized standing" be charged with the problem of standards. This is a course of action that the Commission has followed from the beginning, although other virtues have been placed above "standing." It has repeatedly availed itself of the knowledge possessed by engineers of the United States Geological Survey, Bureau of Mines, and engineers of the various states and universities. In addition, it has never hesitated to employ the temporary services of various unimpeachable experts engaged in private practice. This was done when questions of policy required expert opinions on some particular subject or subjects of controversial character. In others the Commission has used the facilities of its permanent staff. If a doodle bug, or 15,000,000 tons of ore on the basis of three samples, or 3,000,000 on the basis of local legend, is sound engineering practice, then the Commission has set up its own standards.

The charge of meticulosity may be warranted in a few cases. In many instances, however, a registrant has sought through the well considered use and arrangements of words to follow the letter of the law while circumventing its spirit. In such cases the Commission can only fight fire with fire. It is unfortunate that such situations occur. Truth and full disclosure are usually surprisingly simple, while deviations lead on and on, bringing complications from unexpected sources and of unexpected magnitude. It is the Commission's duty in such cases to ferret out the truth by whatever method appears best, a meticulous method if necessary.

Equivocal Opinions Explained

The charge that the Commission is equivocal probably refers to opinions expressed by its employes, and there are probably as many opinions as there are employes. Rulings, however, by the Commission or by any one of its division heads only change when circumstances change. The charge is probably due to the complicated structure of the industry the Commission must police. An unequivocal answer can only be given to the simplest question of future action when all the facts are known. Opinions are changed justifiably when subsequent acts by one who has previously made inquiry prove at variance with facts stated at the time of original inquiry. It is also true that opinions are often sought which will lend an aura of official sanction to a predetermined course of action. This necessarily requires bad faith by the inquirer and misrepresentation to the Commission. Later, when more is known of the true facts, the Commission will alter its opinion.

In a general way, these are general answers to your committee's general criticism. They are unsatisfactory to me, and I feel they must be to you, for both the criticism and answer fail to get to the heart of the problem that faces mine financing at the present time. It is not a question of registration, of S. E. C. like or dislike, of S. E. C. competence or incompetence; it is simply that there is no real demand for speculative securities, and in many instances actually a resistance to them. The Commission has received many letters expressing absolute distrust of any promotional mining issue, letters requesting the exercise of confiscatory powers not possessed by this Commission, letters recording unconscionable frauds on those least able to suffer loss, letters requesting Government ownership and operation of mines, letters from state agencies saying that certain promotions will be summarily evicted from that state whether they are bona fide or not, and many other expressions of contempt and suspicion. They may be called straws in the wind, and the wind has been blowing in one direction for a long time.

Seek to Restore Investor Confidence

The Securities Act actually sets up a code of financial ethics which, if followed, will gradually restore the confidence of prudent investors. If it has placed an excessive burden on issuers, it is only because truth is an excessive burden. If this code of ethics is not followed, and experience shows that it has not been followed in the past, future burdens may make today's seem commonplace. In view of the very practical question of future supplies of cash for promotional enterprises, it would appear prudent to give some attention to investors.

Changes such as we have seen in the past few years come slowly. A change that makes the Government an active party in interest cannot be assimilated at once. It has, however, occurred in aeronautics, investment banking, and in the New York Stock and Curb Exchanges. I have no doubt but what it can be done here, fairly, honorably, and to the everlasting benefit of the whole industry.

COMMENTS on the S.E.C. COMMITTEE REPORT

By SAMUEL H. DOLBEAR

YOU have heard the point of view of the Securities and Exchange Commission with reference to this report. The basic objection which these gentlemen make seems to be that it is not sufficiently specific, notwithstanding that it has been submitted to a considerable number of readers who appeared able to recognize specific recommendations.

The solution to many of these problems lies essentially in two directions. The abandonment of the mass of rules and regulation which the Commission has adopted, substituting therefor more discretionary powers.

This practice has been adopted by the Securities Administration in Ontario, Canada.

The other point on which there is certainly a specific recommendation, calls for the establishment of a division of mining within the Securities and Exchange Commission, with jurisdiction over mining issues.

As to the cost of registration and the length of time involved, we have a record of the cost of registration in 40 or 50 cases, running in one case to $200,000; in another to $100,000, and quantities of them ranging from $25,000 to $50,000. Even for small promotions costs ranging from $10,000 are not unusual. I submit to you that that is an unwarranted burden on the cost of providing funds for mining purposes.

The essential elements of an enterprise can be disclosed with better effect if much inconsequential detail is omitted.

Unsound Engineering Rulings Cited

Now, as to recommendation No. 13 of the report—this states "The Commission has attempted to set up its own standard as to what constitutes sound engineering practice." While I am not in agreement with some of the engineering rulings made by the Commission's engineers, quasi-engineering decisions appear also to be made by auditors, attorneys, or others in the Commission, and some of such rulings are believed to be unsound.

I will mention here six or eight of such rulings of this character. There are many others of similar character. They appear in the judgments that have been rendered by the Commission in various stop-order cases.

Item 3 of the Registration Statement requires the company to state the nature of its business. The registrant usually states that it is in the mining business. In some cases there is some elaboration to include other elements that normally accompany the mining business, such as development, exploration, sinking of shafts, etc.

In the case of new concerns it is a common practice for the S.E.C. to regard these as false statements, pointing out that because the company has not yet done any mining it is not in the mining business. If a company proposes to engage in mining it should be permitted to say that its business is mining, otherwise it must state that it has no business at all.

In one case the registrant stated that it "carried on the business of exploration, development, mining, producing and refining of gold and other mineral bearing ores." The examiner found, and his ruling was sustained by the Commission, that this statement was untrue and misleading because the registrant "has not yet conducted successfully any mining business." They admit that the company had done exploratory and development work and that it had operated a mill, but they deny the company may state that it is in the mining and milling business because the Commission claimed "the source of free milling ore previously worked has faulted out. The registrant has no facilities for reducing or refining the sulfide ores which remain."

Experience of Adjoining Mines

Objection is made to the reference in the prospectus to adjoining or nearby mines. Most engineers want to know if they are dealing with a known mineralized area, and if the ore bodies are of a similar character they want to know all about the experience of other operations in the camp. The exclusion of that information is not only unsound practice but a contribution of the Commission itself to the suppression of essential information.

The Commission has adopted rules by which it defines the words "positive, proven, blocked out, probable, and possible" as applied to ore. I submit that no single rule can be applied safely or equitably in all cases. The degree of proof, for example, in a deposit of Mesabi iron ore may be very different from that required in a vein deposit having highly erratic values. When continuity and uniformity of grade are characteristic, it is customary to adopt more liberal estimates than in the latter case.

There is also a lack of unanimity in the profession as to the decision of the Commission that no element of tonnage or value may be assigned to "possible" ore.

In the Philippine Islands a committee of engineers appointed by the Government was directed to define the use of these terms in security issues. This committee not only permitted the application of definite value and tonnage to possible ore but laid down a mathematical formula for its calculation. Not all of us will agree with the application of mathematical formula. To me it is open to the same objection as the prohibition altogether, in that it is an attempt to apply one rule to all cases. In the matter of ore "in sight," the Commission has held in one case that the term can only be applied to ore blocked out on at least three sides, and stated that it would be improper to include any part which is exposed only on two sides.

Views on Non-Technical Language

The Commission has undertaken to define what the duties of a mining engineer are to his client. It is held for example that his reports be of such a character that a layman may be able to understand the hazards of the undertaking. I do not share the view that this is an inescapable obligation, and I feel sure that reports couched in such elementary terms as that would be unwelcomed by clients who are established mining concerns. In fact, I think there is a good deal of doubt if the layman can be made to fully visualize the degree of hazard, regardless of the language used.

The requirement that a company organized to explore a prospect state in detail what work it will do and what equipment it will purchase, and from whom and for how much, is not sound. Many of these things can only be determined as results are accomplished from time to time.

Should List Past Production

In one decision the Commission criticized the inclusion in the prospectus of a statement showing a large past production of the properties under the assumption that this would lead the investor to presuppose a future quite as rosy. To most engineers, a large past production indicates that the original ore deposits have been impoverished to the extent of former production. Failure to include the statement of former output should certainly be regarded as the omission to state a material fact.

That decisions are made in some cases by those not familiar with mining practice is evident. I quote from a decision rendered within the past year. "Drilling shafts is not in any sense the business or contemplated business of the company, and to require that incidents to the business contemplated and properly set forth under Item 27 should also be included under Item 3, in a case such as this, would be to insist on redundancy and to put a premium on tautology."

EDITOR'S NOTE: *Mr. Dolbear concluded his discussion by quoting extensively and effectively from a letter he had received from an experienced engineer, endorsing* 12 *of the* 15 *recommendations of the Committee, and urging establishment of a mining division in the* S.E.C.

The REGISTRANT'S Viewpoint of S. E. C. Procedure

By HARLAN H. BRADT
President
Bralowe Corp.

PAUL KLOPSTOCK
Chairman of Board
Austin Silver Mining Co.

By HARLAN H. BRADT

THE administration of the Securities Act—which is admittedly difficult—has probably scared off most swindlers, but it has also apparently discouraged sound financing of new mining projects. There is no generally recognized market for new issues of mining securities in the United States today and very little likelihood of one developing under the prevailing conditions. The following personal experiences illustrate this point.

An American gold mining company had struggled from 1930 to rehabilitate an old but promising property in the Northwest and had listed its stock on the New York Produce Exchange in mid-year of 1934. The Securities Act did not apply to the old stock outstanding, but when additional funds were needed, the stock to be sold was doubtfully subject to registration, in the opinion of counsel. However, there were some small stock transfers which might be interpreted as in conflict with the technical regulations of the Commission. The governors of the Produce Exchange were panicky over irregularities which had been disclosed in connection with other stocks listed on the Exchange, and they peremptorily delisted this mining stock.

S. E. C. registration was applied for by the mining company on additional shares to be issued. Much time was involved in preparing the papers, the company's western attorneys being unfamiliar with the practice. The application was finally submitted in December 1934, certain deficiencies were reported by the Commission which were amended and the registration became effective five months later, in May 1935. My engineering report on the property was used as an exhibit and referred to in the prospectus.

Deficiences Caused Stop-Order and Costly Delays

Further financing proceeded and everything appeared to be going according to S. E. C. regulations when a telegram was received late in October 1935, stating that the company must show cause a few days later as to why the stock should not be subjected to a stop-order due to alleged deficiencies in answers to items 50, 54 and 55 of Form A-1. Item 50 applied to the disclosure of interests in the applicant company held by experts engaged by the company. As I was the holder of several thousand shares of stock, as my engineering report had been used in the application for registration, and as several people had been induced to invest substantially in the company on the basis of my opinion, I presumed that the action was directed at me, and I immediately consulted a firm of attorneys to prepare for any contingency.

Courage Saved Enterprise

It was suggested, however, that the exact nature of the deficiencies be first ascertained, and a lawyer was sent to Washington for this purpose. It developed that the alleged violation concerned the company's consulting geologist, who had received stock in partial payment for services over a period of years, and the auditing firm, an employe of which held some securities of the mining company and with which the company had a contract for services. These facts were not disclosed in the application for registration due to an omission by the company's attorneys. The men involved were of excellent character—which fact was self-evident upon casual investigation—but, nevertheless, the company was subjected to a stop-order, which lasted seven months. Hearings were held in Washington to show the guilt of these men, the record of which occupies many pages. A new audit was required by another firm, that merely confirmed the previous audit, large expense was involved, much time was consumed and if it had not been for the ability and willingness of one of the wealthy stockholders to advance necessary funds to the company, the enterprise would certainly have failed and the investment of 500 stockholders been lost. Also, and possibly most important, over 100 men would have been thrown out of work and a small mining community ruined.

Delay Cost Estimated at $150,000

The development, re-equipment and operation of the property were greatly delayed. I estimate the direct cost and the direct loss, in this regard, to have been in excess of $150,000. My own forecast of the results attainable proved ridiculous as to time, and improved management of the company could not be obtained during the period of uncertainty occasioned by the S. E. C. hearings. Fortunately for all concerned, the mine itself showed great vitality and is today producing an average of more than $60,000 monthly, and most of the past unpleasantness is being forgotten. But it does not mitigate the fact that the company was put to great expense and loss by the S. E. C. and would have foundered had it not been for one courageous stockholder.

The Commission made what I consider to be a mountain out of a mole hill on technicalities which could have been adjusted without such delay, publicity and expense, and without jeopardy to the stockholders and intending investors alike. In fairness to the Commission, however, I should point out that this experience illustrates that

it places a premium upon full disclosure of facts, as it raised no objection to my personally holding stock of the company, inasmuch as I had declared myself the owner, and it was so stated in the prospectus.

Example of Serious Commission Delay

Another example illustrates additional points. In the Spring of 1937 it was decided to register the stock of a mining company, which I was managing, with the intention of making a public offering. The financing to date had been done privately through personal friends, and we were advised by counsel that the regulations of the S. E. C. were not applicable up to that time. However, we desired to raise additional funds from the public and to protect the existing stockholders as fully as possible, in the resale of any of their shares.

The company's attorneys, who had had extensive experience with S. E. C. registrations and had helped in drafting portions of the Act, and the company officials labored for over two months to prepare the application. There was no operating history of consequence, no complicated figures and a simple financial structure. The application was finally submitted with the feeling that a nearly perfect job had been done. After 12 of the 20 days' waiting period had run, we received a statement of 26 deficiencies, much to our chagrin. We hastened to amend these in order to have the registration effective within the minimum of 20 days. We then found we were getting into real difficulties, for the Commission evidently did not know just what it wanted and upon conferring with the staff at Washington, some changes were made upon which it later reversed itself.

Stop-Order Slur Prevented by Chance

The evening before the registration was normally to become effective, a wire was received at the company's office—after business hours—stating that, unless amendment was made by return wire to postpone the effective date, a stop order would be necessitated the following morning. Only by chance was this telegram received in time, but a telephone call and wire averted the slur which would have resulted from a stop-order. By dint of much additional labor, the deficiencies were finally covered after another conference in Washington over, in our opinion, trivial and irrelevant points and the registration became effective three weeks late. The direct cost to the company exceeded $10,000, and the management and attorneys were exhausted.

This experience proved so unsatisfactory, and so much doubt existed in our minds as to how the details of a public offering would be construed by the Commission that we decided not to proceed in this manner, and consequently continued our financing with our close friends.

Recently the directors of this company desired to offer to stockholders the privilege of purchasing additional stock up to 3 percent of their existing stock holdings in order to furnish capital for certain improvements deemed advisable at the property. Five of the stockholders offered to underwrite any stock not taken by others.

Indirection of Commission Cited

The S. E. C. was informed by letter of the terms of the proposed issuance of stock with the request that the company be promptly advised whether registration of the additional shares was necessary. After a lapse of two weeks, an answer was received to the effect that perhaps the company was subject to the second clause of such and such a section of the Act, and, if not subject to that, maybe the rules of the Commission adopted pursuant to another section were applicable. The letter did not settle the question by a long ways and the company is still uncertain whether the new stock should be registered, although it seems unnecessary from a businesslike viewpoint. Such indirection on the part of the Commission staff is not conducive to new mine financing.

I have come to this conclusion: The S. E. C. is an indispensable factor in preventing fraudulent and carelessly conceived mining enterprises; but has so far exceeded this function that it has almost strangled public financing of mining companies.

Voluminous and involved rules and regulations—many of which are vaguely or impractically interpreted and applied by the staff—operate to defeat the development of the mining industry through public participation.

Discreet and intelligent use of the powers with which the Commission is endowed, however, can and no doubt will simplify and expedite procedure. This will largely eliminate the delays, uncertainties and unnecessary expenses which I have encountered.

By PAUL KLOPSTOCK

I GREATLY appreciate this opportunity to discuss the Securities and Exchange Acts of 1933 and 1934 with you from the standpoint of certain precedents which have been recently established by the Securities and Exchange Commission in its case against the Austin Silver Mining Company. In my opinion these precedents create far reaching new principles which, if adhered to, may have a most important bearing on any project dependent for its success upon capital procured through public issues.

Sympathetic With Basic Objectives

Let me say at the very outset, that I believe no right thinking citizen can quarrel with any of the basic objectives of the Securities Act of 1933 and 1934. I am also firmly convinced that every decent person engaged in mining is jealous of that industry's good name, and realizes fully if public support is to be solicited and obtained for new and worthwhile ventures—be they speculative or otherwise—that all the cards must be placed on the table, with their faces up, so that prospective buyers of such securities will have every opportunity to judge the value of the venture, on the basis of all known facts—be they good or bad. I am confident that this is also the desire of the Securities and Exchange Commission.

I also wish to express my conviction that the Securities and Exchange Commission is unquestionably motivated by

an honest and sincere desire to protect the public interest and to fairly administer the Securities Acts of 1933 and 1934, which up to this time has undoubtedly represented a most difficult task.

Case of Austin Silver Mining Co.

The experience to be cited arose out of the Commission's action against the Austin Silver Mining Company with which I have been connected since the relatively recent inception of this enterprise. The company was organized early in 1934, and acquired title to practically all of the formerly productive mining properties located in and around the town of Austin, Lander County, Nevada. Two registration statements were filed in connection with this company's financing. The difficulties which eventually confronted the company arose out of its second registration in February, 1936.

The prospectus which was filed in connection with this second registration consisted of 19 closely printed pages of which 9½ pages were devoted to an effort to provide the reader with a broad and comprehensively fair picture of these properties which included over 20 miles of old workings. Generally speaking, every effort was made to comply fully with every then known requirement of the Securities and Exchange Commission. Company's counsel prepared every required document under the supervision of Special Counsel who specialized in practice before the Commission. Among other things, these documents contained a statement fully setting forth my own relations with the mining company—namely, that I had assisted in its promotion; that my firm was to be the underwriter; that I was chairman of its board of directors, and that I also exercised effective control of the company through a right which I had acquired at the time of its inception to designate the manner in which 382,500 shares of the mining company which were in the possession of a holding company were to be voted. This right was acquired to assure responsible management while the project was in its formulative stages and also to prevent the sale of such a large block of shares while the company's financing was under way.

These facts were fully disclosed in the prospectus which, however, failed to state that the owner of the holding company's shares was an old friend who endorsed his holding company shares in blank and delivered them to me in trust to give force to this agreement, and that a verbal agreement existed between us to the effect that I might eventually sell his holding company shares, and in that event I would also be entitled to a participation in the proceeds of such a sale on a basis to be subsequently agreed upon. Our attorneys, who knew these facts, advised us that this personal arrangement had no bearing on the registration of the company's shares; therefore, no reference was made to this arrangement. Failure to make this disclosure eventually led to serious difficulties, as it has since developed that this position also made me one of the corporation's parents. The failure to disclose this parentage was to be one out of the two reasons on which a stop order was to be issued.

Notice of Stop-Order Proceedings

The mining company was informed by the Securities and Exchange Commission on May 3, 1937, of its then desire to make a private investigation of the mining company's affairs. On May 11, 1938, while this private investigation was still under way, the company was notified of the initiation of an 8D proceeding, the object of which was the issuance of a stop order, which when issued has the result of suspending the sale of shares until such a time as all of the Commission's objections are fully met. The basis of this public hearing was the charge that:

> . . . the registration statement included untrue statements of material facts and failed to state material facts required to be stated and material facts necessary to make other statements not misleading.

A public hearing was held in New York which commenced on August 2 and ended on September 30, 1937. The trial examiner submitted his advisory report to the Commission on November 15, 1937. Oral arguments were heard in Washington by the members of the Commission on March 8, 1938. The Commission issued its stop order on July 13, 1938; further amendments were filed subsequent to issuance of the stop order, which was lifted on August 30, 1938, so that fully 16 months had elapsed between the inception and termination of these very costly proceedings.

Our attorneys have informed me that in practice the Commission does not accept any group of amendments, if any one of them fails to cure any alleged deficiency. In this case, two of the amendments were rejected because of such failure.

Failure to Disclose One of Parents

One of these was rejected because it failed to state "that I was one of the registrant's parents." The Commission in calling attention to this deficiency stated in substance "that no charge had been made against the registrant because of its failure to disclose that I was one of its parents and that the registrant had no notice that it should defend itself on that count;" nevertheless, the failure to make this disclosure invalidated this amendment, and thus constituted one of the two deficiencies on which the stop order was issued.

This, in effect, is the equivalent of convicting and punishing a man on a charge which was never brought against him, and for which he had had no opportunity to defend himself. I cannot think that the Commission meant to establish such a one-sided precedent; the principle involved should be repudiated promptly, and steps taken to avoid a repetition of such a case.

Charge of Stock Manipulation

I have previously expressed my belief that these proceedings originated largely out of the opinion of some of the Commission's agents that the market price of the shares had been influenced or manipulated. The prospectus among other things stated "that the right was reserved to buy or sell shares in the market."

The commissioners in reaching their decision to issue a stop order disagreed with the trial examiner's findings to the effect that the market was uninfluenced; their disagreement was based on an inference drawn by them from a letter written to me while I was in Austin by the sub-underwriter, which, as quoted by the Commission, reads as follows:

> The time is fast approaching now when we will have to go to work again in the market, and of course, it is essential that we have plenty of ammunition, which includes facts rather than surmises, before we can go ahead, because you can readily understand if we stop this time for any reason at all it will be difficult to revive interest.

Because of this letter the Commission was largely prompted to reject the second amendment; this, therefore, constituted the second finding on which the issuance of the stop order was based, as they assumed that market manipulation was contemplated. What was actually meant by "work-

(*Continued on page* 85)

TIME STUDIES on MOBILE LOADING MACHINES

● *Recommendations Submitted by the Committee on Mechanical Loading**

WHEN mobile loaders are first installed at a mine, there will be an initial period during which the glaring errors in operating technique can be and are detected and corrected by the mine officials and the loader crews. During this period it will be found necessary to provide better track than has been used for hand loading, the loader operator and crew will become more skilled at their several jobs, haulage schedules will be bettered to give more reliable car supply, and some sort of operating routine for cutting, preparation and other accessory work will be evolved.

The improvements above outlined are essential, but such "trial and error" changes are not in themselves sufficient to get the maximum performance from loading machines. Further improvement can then be realized only by time studies of the loaders, the analysis of time study data, and correcting abuses and faulty practices disclosed by the time study analysis. To realize real benefits from time studies, it is essential that they be made properly. It cannot be too strongly emphasized that intelligent, diligent, well-trained observers are vitally necessary if authentic, complete and usable time study data are to be obtained. Time studies made by inexperienced or unqualified men may often be worse than useless in that erroneous (and expensive) conclusions may be drawn from their work. Experience, training and intelligence should be the basis of selection of observers, not mere availability; the mere possession of a stop watch, pencil, board and a pad of forms does not qualify a person as a time study observer.

No machine and its operating crew, whether it be a mobile loader, a machine tool or other unit, is or can be run at 100 percent output rating for 100 percent of the time. It is necessary to take this into account in analyzing time studies; a reasonable proportion of delay time during a shift is normal. What that reasonable proportion should be is controversial; it is dependent on equipment provided and its maintenance, natural conditions, quality of labor, management and other factors; each operator must decide for himself what percentage of delay time fits his conditions and expectations. Mechanical and electrical troubles, conflicts, waiting for cars, malingering and other elements go to make up the delay time total.

Finally, it is important to recognize that good time studies are only useful in so far as the faulty operating practices disclosed by them are corrected. Such correction is the prime purpose of time study; the relative success or failure of a time study program depends upon the extent to which the information made available is applied.

Purpose of Time Study

The purpose of time study is to improve performance by the following means:

1. Detection of elements in a cycle which are unnecessary or which take too long a time.
2. Reduction in time required for necessary elements.
3. Discovery of better methods.
4. Comparison of performance of machines in the same general kind of work so that performance standards based on actual loading records can be set up.

Time Study Equipment

It is recommended that mobile loader time studies be made by continuous watch readings rather than the "snap-back" method. Decimal minute watches are recommended. In addition to the stop watch, the observer should carry the following items: Standard watch, clip board 9 x 13 in., rubber bands or holder to fasten stop watch to board, pad of forms, several HB pencils, 50-ft. metallic tape, and 6-ft. rule, either folding or curved steel tape type.

A time study sheet such as that illustrated is recommended. This is used not only to record observed times for the various elemental operations, but also to list physical conditions affecting performance for the various places in which loading is done; these conditions comprising grades, length of tram between places, distance of change switch from the face, etc. Any other data considered necessary, for example number in crew, occupations, and dimension of places, may be shown on the reverse side of the form.

Time Study Elements

In studying mobile loaders there has been and now is considerable difference in classification of cycle elements, and these can usually be traced back to the face where the study was made. One observer will include in a given element such as "load coal," subelement operations which another observer would include elsewhere. Obviously if there is to be useful and accurate comparison of performance, a definition of what each element is becomes necessary.

The elements defined below are those usually found in making time studies of mobile loaders. Generally the practice has been to group the elements under one of two heads; that is, working (productive) time and delay time. To these has been added a third

* This committee, under the chairmanship of Newell G. Alford, is preparing a series of recommended forms for recording mechanical loading performances. Other reports will be published in later issues of THE MINING CONGRESS JOURNAL.

Time Study Form Recommended by the Committee on Mechanical Loading

MINE	SECTION	FOREMAN	OPERATOR	OBSERVER	SHIFT	DATE	HT. COAL	WIDTH PL.	ROOF COND
MACHINE NO.	MACHINE TYPE	NO. MEN IN CREW	RATING OF CREW	TIME START	TIME STOP	ELAPSED TIME	REMARKS		
PLACE	ENTRY	CARS SLATE	CARS COAL	TONS PER CAR	COAL TONNAGE		Tram and Car Change Distances, Description of Delays and Conditions affecting production, etc.		

Car No.	Con't. Time	PRODUCTIVE ELEMENTS					SERVICE	DELAY ELEMENTS						Make list of crew and sketch of place on back
		Load Coal	Load Slate	Mine Coal	Shift Mach.	Tram	Change Cars	Loader	Haulage	Power	Conflicts	Preparation	Misc	
Carried Forward														

Note: Size recommended for this form is 8½" x 11"

classification; namely, service; which includes only the item of change cars. Some operators have regarded this heretofore as productive time, others as unavoidable delay time. A good case can be made for including it under either productive or delay time. Under present methods in general use changing cars with consequent stopping of the loader is absolutely necessary and part of the cycle; therefore, should not be included in delay time. Neither should it be included as productive time inasmuch as the loading unit has ceased loading.

Productive Elements

1. Load coal. Includes only that time interval during which coal is moving along the boom of the loading machine and into the car.

2. Load slate (rock, stone). Includes only that time interval during which slate (rock, stone) is moving along the boom, either into car or into the gob for stowing. This item is included for those mines at which slate disposal is a recognized part of the cycle of operation. It is not intended to include the casual moving of slate out of the way when it comes down on, and interferes with the loading of, coal—such handling is a delay.

Enter in the time study sheet as part of the data under "Remarks" the number of cars of slate loaded, or some other measure of quantity such as cubic feet in place or as stowed.

3. Mine coal. Includes that time interval during which it is necessary to shoot, dig, or bar down the coal so that the loading machine then in the place can proceed with loading out the cut. By this is meant only the time usually necessary for such accessory operations and occurring regularly. It must not include such work, however, when resulting from poor preparation of the place. The observer should not continue to enter times for this item as a routine matter but should carefully analyze the real necessity for such work. Often by a change in methods, work in this category may be greatly reduced in quantity or entirely eliminated.

4. Shifting machine. The time spent shifting the position of the loading machine so that it can load more advantageously and while there is a car at the loader and coal ready for loading in the cut. The observer should study carefully whether or not there is real necessity for all the shifting about actually done during the loading of the cut. If he concludes that unnecessary shifting of position is going on, a special study should be made to determine the facts.

5. Tram. This is the time required to move the loading machine from one place to the next and includes not only the time the loading machine is in motion but also "preparing to move" time and "preparing to load" time. In general, when there are no intervening service delays this will be the time interval between last coal over the boom in the completed cut and the first coal over the boom in the new cut. The observer should exercise judgment to determine whether part of the time spent ostensibly "preparing to load" or "preparing to move" is not in reality malingering.

6. Miscellaneous productive elements. Occasionally there may be productive time which cannot be grouped under any one of the elements listed above. Times for miscellaneous items may be listed in the miscellaneous column on the right-hand side of the time study sheet. Use of this classification should be made with caution and kept to a minimum.

Service Elements

Change cars. This is the time interval between "loaded car out" and "car under" the boom. When car service to the loading machine is interrupted, such delay time is not included as "change cars" but instead under the appropriate delay.

Car change time should be divided by field observation into two subelements:

1. Change cars—loader crew working. If, during the time there is no car under the boom, the loader crew is doing useful or necessary work that would have to be done in any case, then the time so spent usefully should be recorded on the time study as "Maneuver loader while changing

Table Illustrating Summary of Time Study Data

Element	Operation Working Less than Standard Shift — Minutes	Operation Working Less than Standard Shift — Percent	Operation Working More than Standard Shift — Minutes	Operation Working More than Standard Shift — Percent
Total Productive Time	260.00	59.52	265.00	60.00
Load coal	150.00	60.00	152.50	59.80
Load slate	30.00	12.00	32.50	12.76
Mine coal	20.00	8.00	20.00	7.84
Shift machine	20.00	8.00	20.00	7.84
Tram	30.00	12.00	30.00	11.76
Total Service Time	100.00	23.81	100.00	23.53
Change Cars - Loading Crew Working	30.00	7.14	30.00	7.06
" " - " " Idle	70.00	16.67	70.00	16.47
Unavoidable Delay Time	25.00	5.95	25.00	5.88
General power failure	25.00	5.95	25.00	5.88
Unnecessary Delay Time	45.00	10.72	45.00	10.59
Loader cable	8.00	1.91	8.00	1.88
Wait for cars	10.00	2.38	20.00	4.71
Conflict with cutter	4.00	.95	4.00	.94
Tight coal	6.00	1.43	6.00	1.41
Power off	2.00	.48	7.00	1.65
Quit early	15.00	3.57	-	-
Eat lunch (more than 30 minutes)	-	-	-	-
Total Productive, Service, & Delay Time	420.00	100.00	425.00	100.00
Idle Time and Reconciliation				
Start early	-		15.00	
Start late	-		-	
Quit early	15.00		5.00	
Quit late	-		-	
Eat lunch	30.00		35.00	
Net time gained	-		5.00	
Net time lost	15.00		-	
Total Time	450.00		460.00	

cars," "Set timber while changing cars," or other appropriate entry.

2. Change cars—loader crew idle. If, during the time there is no car under the boom, the loader crew is doing no useful and necessary work, then this time should be recorded as "Loader crew idle while changing cars." It is important that the observer distinguish between the crew merely appearing to be busy on useful work, and actually being busy.

Delay Elements

Delays may be defined as any occurrences which retard or hinder the orderly and systematic loading of coal into cars and the movement of loads from and empties to the loading machine. There are a great many kinds of delays, but all can be classed either as "Unavoidable" or "Unnecessary."

Unavoidable delays are defined as those beyond the control of either the loading crew or the mine management; that is, they could not have been avoided by the action of either group at the time of occurrence or previously. There are few delays which really belong in this group.

Unnecessary delays include all those mishaps, accidents and other occurrences which interfere with production but which could have been avoided by better supervision, maintenance, planning, discipline, crew training or coordination.

Some of the common delays are listed and classified below:

Unavoidable Delays

1. General power failure.
2. Bad roof (when impossible to predict or control).
3. Slate down on coal (usually an unnecessary delay).

Unnecessary Delays

1. Loader:
(a) Mechanical breakdown.
(b) Electrical breakdown.
(c) Lubrication.
(d) Cable.
2. Haulage:
(a) Cars off track.
(b) Repairing track.
(c) Wait for cars.
(d) Rerail.
(e) Bad-order car.
(f) Push cars by hand.
(g) Locomotive failure.
3. Power (if possible, specify cause of trouble, such as low voltage, breaker out, wire down, etc.).
4. Conflicts:
(a) Blocked by cars (cutters, track, etc.).
(b) Locomotive (cutters, trackmen, supply men, etc.).
5. Preparation:
(a) Tight coal.
(b) Slate down on coal.
(c) Bad shot.
(d) Redrill and reshoot.
(e) Timbering.
6. Miscellaneous:
(a) Quit early.
(b) Start late.
(c) Malingering.

Summarizing Studies

In general, for purposes of comparison of performance the main elements given above will usually be sufficient for the time study summary. However, while making the study the observer should note under remarks a description of sub-elements as they occur so that a more detailed summary may be made if necessary.

In working up the summary sheet, total it in accordance with the classification of times as shown on the accompanying table, where two typical cases in summarizing are illustrated.

The purpose of the entries under "Idle Time and Reconciliation" is to adjust the study for working undertime and overtime. For example, should the operation start five minutes late but only twenty minutes was taken for lunch instead of thirty minutes, the operation worked five minutes overtime.

When the net time entered under "Idle Time and Reconciliation" results in a gain, add this time to the actual observed Productive, Service, and Delay Time, which, in this case, would exceed the regular shift time.

When the net time entered under "Idle Time and Reconciliation" results in a loss, enter the loss under "Unnecessary Delay Time." In this case "Total Productive, Service, and Delay Time" will be equal to the actual shift time.

Submitted Dec., 1938.

Sub-Committee on Time Studies.
W. R. CUTHBERT, *Chairman.*

J. D. ROGERS

J. B. MORROW

JOHN T. SYDNOR

D. H. PAPE

WALTER F. CLARKE

PROGRAM
for COAL CONVENTION
Drafted by COMMITTEE
Under Leadership of W. J. Jenkins

J. M. JOHNSTON

R. L. WILHELM

B. H. SCHULL

C. Y. THOMAS

H. L. RICHARDSON

State Chairmen

T. E. JENKINS

FRED A. JORDAN

RALPH E. KIRK

State Chairmen

WITH only a little more than two months to go, work of whipping into shape plans for the 16th Annual Coal Convention and Exposition of the American Mining Congress, to be held in Cincinnati, Ohio, April 24-28, is now proceeding rapidly. Enthusiasm of committees working toward this end is at high pitch, and comments coming from all coal-producing areas reflect the increasing attention manifest in this important event—the NUMBER ONE ATTRACTION on the coal miner's annual calendar.

Heading up the important work of developing a program worthy of the studied attention of the thousands of operating men who will be in attendance is W. J. Jenkins, president, the Consolidated Coal Company, of St. Louis, as Chairman of the National Program Committee.

Of equal import is the formulation of plans and the proper handling of arrangements that will insure an entire week of comfortable surroundings and pleasant relaxation to guests. It is a pleasure to announce that P. C. Thomas, vice president, Koppers Coal Company, will direct this work as Chairman of the General Arrangements Committee.

Program to Rivet Operators Interest

Well attended meetings of the State Program Committees were held during the week of January 9 in Chicago, Pittsburgh, Charleston, Lexing-

ton and Birmingham, with a total of 74 leading coal operating men participating. Recommendations were made concerning general procedure to be followed in the convention sessions, and particular emphasis was placed on developing effective methods to promote live floor discussion. In addition, specific subjects and authors were suggested from which to choose a program that will command the interest of responsible coal mine operators and officials from all important producing districts in the country. State chairmen for areas east of the Mississippi led these round-table discussions, and interest of committeemen working with them was evidenced by the splendid turnouts and active discourse at each.

Thus amply supplied with material, a meeting of the National Program Committee was held January 28 at Cincinnati to decide on procedure for the sessions, and determine the subjects to be discussed. W. J. Jenkins presided, and the following State Chairmen were present: J. M. Johnston (Illinois), F. A. Jordan (Ohio), R. E. Kirk (Alabama), J. B. Morrow (Pennsylvania), H. L. Richardson (Kentucky), B. H. Schull (Indiana), J. T. Sydnor (West Virginia), C. Y. Thomas (Southwestern States), and R. L. Wilhelm (Tennessee). Members of the staff of the American Mining Congress present included Julian D. Conover, secretary; G. B. Southward, mechanization engineer; P. D. McMurrer, assistant to secretary; and R. J. Lund, editor, MINING CONGRESS JOURNAL.

After much relevant discussion the following recommendations were made by the committee:

Convention Sessions.—To be held for four days, starting Monday morning and closing Thursday evening, with a morning and an afternoon session on each day, each session of two hours duration.

Floor Discussion.—Endorsed fully the recommendations of the State Committees that an effort be made to have comprehensive floor discussion on each paper presented. In order to encourage adequate discussion, the following recommendations were made: That all floor discussion be delivered orally and included in the reporter's transcript, but that no discussion be published, quoted or otherwise circulated until the speaker has been furnished with a copy of his remarks and given the option of correcting, amplifying or withdrawing them; and that the Floor Committee have a member from each state to cooperate with his State Chairman in selecting men to discuss papers of interest to their district.

Number of Papers.—That in order to allow ample opportunity for floor discussion there be only three papers at each session.

Classified Subjects.—That all papers covering any one phase of mining be presented at the same session; and that each of the following subjects be made the basis for a convention session: (a) Conveyor Mining; (b) Mechanical Loading; (c) Surface Preparation; (d) National Economic Problems; and (e) Safety and Supervision.

General.—Confirmed action at each of the State Committee meetings endorsing the educational and constructive value of the Convention and Exposition as an annual event of outstanding importance for the operating men of the coal industry.

P. C. THOMAS
Chairman, General Arrangements Committee

In connection with the 1940 Convention and Exposition, the Committee unanimously voted that the Program Committee be organized and its work started in the fall of 1939, in order that more time might be available for formulation of the program and for preparation of papers by the speakers.

Of particular interest was the recommendation that a special exhibition booth be made available for coal operators to exhibit models or illustrations of unusual ideas or "operating kinks" which have been designed locally but are not patented or manufactured products.

A tentative list of subjects to be presented is as follows:

Session on Mechanical Loading.—Determination of Factors Affecting Cost of Mechanical Loading; Production of Fine Coal with Mechanical Loading; Symposium on Service Haulage: (a) Rubber-Tired Cars, (b) Large Capacity Shuttle Cars, and (c) Standard Mine Cars.

Session on Conveyor Mining.—Engineering Studies and Operating Cost Analyses; Symposium on Conveyor Loading; (a) Mechanical Loading, (b) Hand Loading and (c) Self-Loading Conveyors.

Session on Surface Preparation.—"Prescription" Mixing and Blending Prepared Coal; De-Watering to Prevent Freezing; Latest Developments in Cleaning Minus ½ Inch.

Session on Safety and Supervision.—Safety Rules, Standards and Inspection; Securing and Maintaining Employe Cooperation in Safety Work; Standardizing State Examinations for Mine Officials.

Session on National Economic Problems.—Symposium on the Guffey Act by several members of the coal industry. If such a discussion cannot be satisfactorily arranged, the session to be devoted to three papers on other subjects of general interest (outside of mine operation), including research and promotional work to increase coal consumption.

Unclassified Subjects.—Roof Problems and Timber Recovery; Limiting Economic Factors in Main Haulage; Machine Maintenance — Practices, Procedure and Records; Cutting and Welding for Fabrication and Equipment Repair; Tests on Coal Cutting Bits; Culm Flushing and Backfilling; Coal Stripping; A Worker's Idea of What a Mine Foreman Should Be.

Exhibits Again Feature Meeting

Part and parcel of the Cincinnati Convention is the mammoth exposition of coal mine equipment and supplies assembled by well known manufacturers from far and near.

Interest of exhibitors in this year's show is keener than ever, and present space reservations indicate another virtual sell-out. In addition to the large number of manufacturers who are known to coal men as "regulars," a considerable number of new exhibitors will participate, thus promising a more comprehensive exposition than ever before.

Manufacturers' representatives will again be on hand to discuss up-to-date methods of solving baffling operating problems. The opportunity thus afforded to study the hundreds of exhibits and consult with experts in attendance at each booth will again be a prime motive in bringing thousands of coal men together at Cincinnati for their annual meeting.

41st Annual Meeting of the American Mining Congress

HOWARD I. YOUNG
Reelected President

THE annual meeting of the American Mining Congress for transaction of business, election of directors and officers and adoption of policies for the coming year was held in the Mayflower Hotel, Washington, D. C., January 27, with prominent representatives of all important branches of mining in attendance.

Focusing their deliberations on important present-day economic and social problems facing the entire mining industry, the Resolutions Committee, headed by R. C. Allen, vice president, Oglebay Norton and Company, met early in the morning and completed their work of formulating a concise Declaration of Policy in time to submit to the luncheon business meeting.

With Howard I. Young, president of the American Mining Congress, presiding, the annual business meeting was held immediately following lunch. After passing an amendment to the by-laws providing for an increase in the number of directors, reports were made by Howard Huston, chairman of the Nominating Committee; Erle Daveler, chairman of the Finance Committee; Henry B. Fernald, chairman of the Executive Tax Committee; and a summary of work done by the organization during the past year was presented by Secretary Julian D. Conover.* Pertinent comments on the tax legislation outlook were given by Ellsworth C. Alvord, counsel of the American Mining Congress; and Dr. C. K. Leith, of the University of Wisconsin and chairman of the Mineral Advisory Committee to the Army-Navy Munitions Board, outlined general aims of the committee and subcommittees in their effort to detail U. S. requirements and sources of strategic and critical minerals in event of an emergency, viewed against the present background of crucial relations between democratic and totalitarian powers.

Members of the Board of Directors elected were as follows: Donald A. Callahan, Wallace, Idaho; Louis S. Cates, president, Phelps Dodge Corporation; Clinton H. Crane, president, St. Joseph Lead Company; James D. Francis, president, Island Creek Coal Company; Edward B. Greene, president, Cleveland-Cliffs Iron Company; William J. Jenkins, president, Consolidated Coal Company; N. W. Rice, president, U. S. Smelting, Refining and Mining Company; and H. L. Pierce, M. A. Hanna Company.

Following the business session the directors met and reelected the following officers: President, Howard I. Young, president, American Zinc Lead and Smelting Company; first vice president, D. D. Moffat, vice president, Utah Copper Company; second vice president, E. B. Greene, president, Cleveland-Cliffs Iron Company; third vice president, Donald A. Callahan, Wallace, Idaho; J. F. Callbreath, secretary-emeritus; and Julian D. Conover, secretary.

Those present at the business session are shown in the photograph on page 68.

A Declaration of Policy, crystallizing the position of the mining industry on national matters of vital importance facing it today, was presented by Mr. Allen at the business session, and was unanimously adopted.

* See page 68 for his complete report.

A Declaration of Policy

Relation of Government and Business

Confidence is the foundation of economic recovery and stability. Essential to confidence are balanced budgets; stable money; thoughtful, well-considered legislation confined to sound, general principles; impartial administration of the law, and encouragement of private enterprise and initiative.

Government should not engage in competition with private industry.

Employe Relations

The interests of the general public, of employes, employers, and of capital, are mutual and can be served best through the fullest measure of cooperation.

The National Labor Relations Act.—We recognize and accept the principle of collective bargaining. We regret that the application of the National Labor Relations Act has resulted in undeniable injustice to employes, employers and the public, and urge proper amendments to the Act and changes in methods of enforcement to insure its equitable application and administration.

Health and Safety.—We believe in the best possible working conditions for employes in the mining industry, and approve all reasonable and proper measures for promoting their health and safety. We recognize the good effect of adequate laws that will protect the employe from health hazards and the employer from unfair claims.

Taxation

The constant threat of continually increasing taxation and annual changes in tax laws, combined with adverse policies in other fields, create constant uncertainty as to present and future tax liabilities and consequently restrict and curtail business enterprise, impose severe and unnecessary limitations upon employment, and discourage and retard the growth of national income on which the tax revenues

of the Government must depend. Maximum yields from taxation over a period of years can be obtained only through the adoption of policies which do not discourage, deter, or destroy business initiative, enterprise, expansion, and employment. Only under such policies can our national income be sufficiently increased to provide adequate Government revenues. Only under such policies can the Federal budget be relieved of heavy demands for unemployment relief.

A sound fiscal system requires adequate control over expenditures, which must be kept within the revenue yields of a sound and reasonably permanent system of taxation. Congressional responsibility for expenditures should be united with Congressional responsibility for revenues. We urge that each House of Congress create a Committee on the Budget, the membership of which will include members responsible for appropriations and members responsible for taxation. The annual executive budget, containing estimated revenue yields and the proposed expenditures for the year, should be referred to this committee. After appropriate committee consideration and full debate, each House of Congress should then determine and fix the maximum amount of expenditures for the year, and require that the separate appropriation bills, as well as legislation authorizing appropriations, conform to this determination, and the aggregate be kept within this maximum amount. With a ceiling thus placed upon expenditures, an effective control by Congress over both taxation and appropriations can be restored and maintained.

The Congress made substantial progress towards a fairer system of business taxation through the enactment of the Revenue Act of 1938 which greatly modified the penalty tax on the so-called undistributed profits of corporations, assured more equitable treatment of capital gains and losses, preserved the principle of reasonable depletion allowances and permitted periodical redeclaration of value for capital stock tax purposes. These provisions and the fact of their enactment have had an encouraging and stimulating effect on employment and business enterprise and will yield increased rather than decreased revenues to the Government. We urge the repeal of the remnant of the undistributed profits tax and the elimination of this and other needless complexities of the law.

The flat-rate tax upon corporate income should be reestablished; business losses of one year should be carried forward and deducted from future income; taxable income should be computed upon the basis of consolidated returns compulsory for affiliated corporations; the tax on dividends received by corporations should be removed; the deduction of capital losses should be allowed without limitation; taxable income should conform more nearly to true income computed in accordance with accepted accounting practices, and the capital stock tax should be repealed at the earliest possible date, and until repealed an annual declaration of value should be granted. We are confident that these are all appropriate features of tax legislation designed to yield maximum revenues over a period of years.

Reciprocal Trade Agreements

Reciprocal trade agreements should not become effective until they have received the approval of the United States Senate.

Monetary Policy

We favor the return of control of our monetary system to the Congress. We favor a currency with a metallic base as opposed to a so-called managed currency. We favor the use of both metals —gold and silver—in such monetary system, and we favor the continuation of purchases of newly mined domestic gold and silver as a means of maintaining a metallic base for our currency.

We urge repeal of the law prohibiting ownership of gold coin or bars by our citizens, thus reestablishing the right of such ownership. We also urge that, to avoid further additions to present excessive gold stocks in the hands of our Government, further gold purchases be paid for with gold coin or gold certificates redeemable in such coin.

Securities and Exchange Commission

We endorse the report of our Committee on Cooperation with the Securities and Exchange Commission, dated October 24, 1938. We urge prompt adoption of the recommendations for simplification of the Securities and Exchange Commission regulations and administration, and the establishment, within the Commission, of a Division of Mining, headed by a man of experience and recognized standing in the mining industry, with supervision over the issues of mining companies.

Great Lakes-St. Lawrence Waterway and Power Project

We oppose the pending treaty with Canada providing for the construction of a Great Lakes-St. Lawrence deep waterway and for immense hydroelectric power developments. The project has no economic justification, the proposed transportation and power facilities being neither needed nor desirable. It would impose unwarranted additional tax burdens. It would be of principal benefit to foreign production and shipping at the expense of American industries, agriculture, railroads and water carriers. Millions of tons of American-produced commodities, particularly coal, iron ore, and metal products, would be displaced through the invasion of the vast interior American market by heavy imports from countries having low living-standards, forced labor, and government-subsidized commerce. Markets for large tonnages of coal would be closed by the huge surplus of hydroelectric power and by lessened fuel requirements of our railroads and water carriers.

The project would disrupt and demoralize a great section of our economic life, producing serious unemployment and reduction in living standards, and would tend to destroy great mining, metallurgical, and other industries which are vital to the welfare and self-sufficiency of our country.

Water Pollution

We commend the action of the 75th Congress in rejecting amendments to the Barkley-Vinson Water Pollution Bill, which amendments would have vested regulatory control over water pollution in a Federal agency instead of leaving such control in the hands of state governments, to be supplemented by interstate compacts where necessary.

Public Land Policy

We reaffirm our endorsement and approval of the historical and time-honored system of locating mining claims and granting of patents which has proved to be such a factor in the discovery and development of mineral resources. This system is thoroughly grounded both in practice and law, and for the future well-being of the national economy should be continued without change.

We deplore governmental prohibition of the development of valuable mineral areas in the national game preserves and needless restrictions to such development on other public lands.

Strategic Materials

We recognize that the troubled state of the world today makes it necessary for our Government to lay plans to meet with success any national emergency.

Our defense plans must of necessity include provisions for an adequate supply of strategic and critical war materials.

As one of the essential industries in the furnishing of such materials, we pledge our cooperation in the development and execution of a program directed to that end. We ask Congress to make possible, under the direction of the Bureau of Mines and Geological Survey, a discovery and research program for minerals in which our country is deficient.

U. S. Bureau of Mines
U. S. Geological Survey

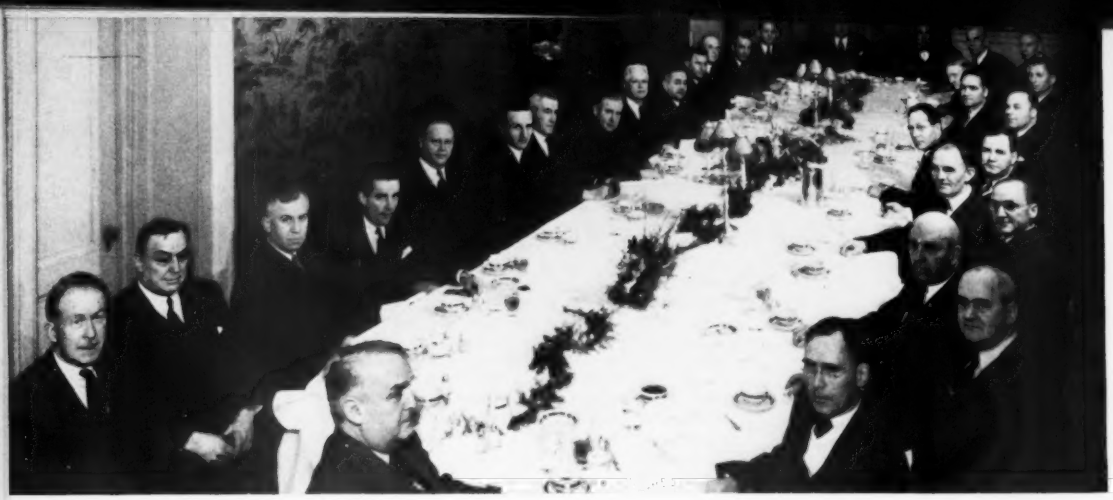
We endorse the work of the U. S. Bureau of Mines and U. S. Geological Survey. Their services have been invaluable to the mining industry.

We disapprove any impairment of their functions. We further disapprove any alteration of the duties of the Bureau of Mines and especially its diversion from a broad program of research in safety and health problems to work of inspection and control, which should properly be handled by the state governments.

Legislative Principles

We urge careful, thorough, and independent investigation and consideration by the legislative branch of the Government, not merely as to the objectives of proposed legislation but also as to means proposed for accomplishing such objectives.

The enactment of laws, admitted to be defective and designed to be made workable only after amendment, is unsound and detrimental to the country's prosperity and development, and to the people's confidence in their Government.



Annual business meeting of the American Mining Congress

RESUME of 1938 ACTIVITIES of the American Mining Congress

● ***Report of Julian D. Conover, Secretary, at 41st Annual Meeting, Washington, D. C., January 27, 1939***

THE past year has seen a most encouraging increase in the membership and support of the American Mining Congress. This has been true in all branches of the mining industry and in all parts of the country, and has placed us in a position to do more effective work than ever before.

Closer Cooperation With State and Regional Associations

A closer cooperation has also been established with the various state and regional mining associations throughout the country, including particularly those which represent large numbers of small mining operations. The coordinated effort of these associations with their thousands of members, working with and through the American Mining Congress, adds greatly to the strength of our position in presenting a united front for the entire mining industry.

An all-day meeting of the officials of these associations was held in conjunction with our western convention last October. More recently, at their request, we have set up an interchange of information covering pending legislation which affects mining in the various states and the measures being taken to protect the industry. This includes such subjects as taxation, including severance taxes; "syndicated" labor legislation; stream pollution; compensation insurance; occupational disease legislation, and various measures for promoting the development of mineral resources. The American Mining Congress, in accordance with its established practice, takes no part in the issues before any state legislature, but through this service it makes available to the industry in each state the experience of others faced with similar problems.

An important factor in the increasing acceptance of the American Mining Congress as mining's national organization, is the reorganized MINING CONGRESS JOURNAL. Beginning in January, 1938, our official publication appeared in completely new form, with marked improvements in editorial content and general arrangement. Wider reader interest has been secured and circulation increased 25 percent during the past year. Thus the story of mining and its problems and of the work of the Mining Congress is reaching a constantly growing audience throughout the mining world.

Conventions Very Successful

Our 1938 Coal and Metal Mining Conventions were again most successful. The attendance at Cincinnati, in spite of the recession in business, was 4,357 and the attendance at Los Angeles was 2,268. Intense interest was shown in the expositions of mining machinery and equipment, and exhibiting manufacturers reported that the results were of concrete value to them. The American Mining Congress, as you know, has pioneered in encouraging the development of modern mechanized mining. This has been particularly true in the coal industry, and the present work of our Coal Division, with its various committees comprising the best operating brains of that industry, is making a substantial contribution to improved mining methods and greater production efficiency.

Our legislative work is well known to you, and I shall touch on only a few highlights of the past year and the prospects for 1939.

Tax Legislation

Taxation, as usual, has constituted one of our most important activities. Eighteen months ago, the Treasury launched a determined attack upon the existing depletion provisions of the Revenue Law. This attack was met,

and no change in these provisions was made in the 1938 Act. The undistributed earnings tax, which we had consistently and vigorously opposed before and since its enactment, was practically eliminated in the new law. The capital gains tax was simplified and reduced. The right to revalue capital stock, for purposes of capital stock and excess profits taxes, was granted for 1938 and triennially thereafter. No change was made in the right of tax-free liquidation of subsidiary corporations, originally sponsored by the American Mining Congress in the 1935 Act and revised and made workable through our efforts in 1936. A beginning was made toward securing the "last-in, first-out" treatment of inventories. The propriety of carrying forward business losses of one year to a succeeding taxable year was recognized in connection with the modified undistributed earnings tax.

Prospects for revenue legislation in the current session of Congress are not yet clear. The President has suggested that moderate tax increases might safely be considered; he has favored renewal of expiring excise taxes, and taxation of Government salaries and income from tax exempt securities; and thus far this year has been silent as to renewal of the undistributed earnings tax, the remaining portion of which expires this year. Influential leaders in Congress are known to favor the complete elimination of this ill-conceived principle of taxation. What further tax messages may come from the White House no one knows, and no action is anticipated until after the March 15 returns.

Work Toward Averaging-of-Hours

The Wage-Hour Bill was last year effectively buried in committee until the Florida primaries on May 21, following which pressure from administration sources forced its enactment. An amendment to this bill, to provide a six-months' averaging of hours in the mining industry, received sympathetic consideration from the Conference Committee. It was largely vitiated, however, by the requirement, inserted at the eleventh hour, that such averaging be subject to collective bargaining under the National Labor Relations Board. The Wage-Hour Administrator apparently does not favor amendment of the present Act, at least until after a period of vigorous enforcement, and this view will probably be supported by Labor Committees of the House and Senate. A suitable averaging-of-hours provision is urgently needed, particularly in the case of isolated mining communities.

No action toward amendment of the National Labor Relations Act was possible this past year, though vigorous criticism was expressed in both Houses of Congress. The most outspoken critic, Senator Burke of Nebraska, addressed our Los Angeles convention. Wide publicity was thus given to the need for revision of the law, and this issue will no doubt be active in the present Congress. There is also talk in Washington circles that the Labor Relations Board may liberalize its own attitude, in the effort to meet the growing storm of criticism.

Proposals for Federal licensing of corporations doing interstate business were not acted upon last year and have again been introduced at this session. Senator O'Mahoney's Temporary National Economic Committee, originally known as the "Monopoly Committee," is continuing its study of business methods, but plans thus far announced do not include any specific studies of the mining industry.

Stream Pollution

A Water Pollution Bill was finally passed in the closing days of the 75th Congress, but was vetoed by the President because of the absence of budgetary control. This was a "survey and planning" measure, with provision for grants and loans for handling pollution problems, but without the drastic provisions for Federal regulation and policing which would have seriously interfered with mining operations. Another pollution bill will no doubt be enacted at this session; on the basis of developments to date, however, we anticipate that this may again be confined to a survey and planning measure.

A Great Lakes-St. Lawrence Waterway treaty, similar to that rejected in 1934, may be negotiated with Canada and submitted to the Senate this year. It is evident that such a project would tend to destroy the vast mining and metallurgical activities which are tributary to the Great Lakes Basin, would be economically unsound, and would create a heavy and unwarranted tax burden. Our Coal Division has emphatically gone on record against it, and further action will be considered at this meeting.

Revision of the Reciprocal Trade Agreements program is also to be considered this year. A requirement that all such agreements be ratified by the Senate is contained in several measures proposed by representatives of mining states. Of special note is a Senate resolution introduced this week. This holds it to be the sense of the Senate that such foreign trade agreements *are treaties* which under the constitution can be made only by and with the advice and consent of the Senate. This resolution can be passed by a simple majority vote of the Senate and is not subject to Presidential veto.

Expiration of the Gold Reserve Act and related legislation on June 30 of this year will no doubt bring further action by Congress on monetary policy. A specific proposal has been advanced by the American Mining Congress which would enable the Treasury to avoid further accumulation of gold and at the same time maintain the existing price; under this plan it is proposed to reestablish the right of private ownership of gold, and to authorize the Treasury to pay for additional gold purchases, when desired, in gold coin.

An important part of our work, as you know, involves contact with the numerous Government departments and agencies which have to do with mining. These include the Treasury, the Bureau of Internal Revenue, the Mint, the State Department, the Tariff Commission, the Securities and Exchange Commission, the Social Security Board, the Labor Department, the Wage-Hour Administration, the National Bituminous Coal Commission, the Bureau of Mines, the Geological Survey, the General Land Office, and numerous others. The scope of this work is constantly increasing with the greater complexity of our Federal Government.

S.E.C. Committee Report

In the past year our Committee for Cooperation with the Securities and Exchange Commission submitted specific recommendations for improving the registration procedure for securities of mining companies. An active effort is under way to secure a separate mining unit in the S.E.C., which it is felt would do much to reduce the delays and expense of mining registrations.

Government agencies charged with the administration of laws which affect mining frequently call on our office for aid in preparing suitable regulations and interpretations. Thus we are at present engaged, at the invitation of the Bureau of Internal Revenue, in a detailed study of the proper treatment of lessor-lessee interests under percentage depletion. Involved in this same discussion is the extremely important subject of de-

(*Continued on page 71*)

GOLD

● *A Suggested Plan for Maintaining the Price Fixed by the United States Without Adding to Its Gold Holdings Except When Desired*

THE AMERICAN MINING CONGRESS
WASHINGTON, D. C.

ON December 30, 1938, the United States Government had over 414,600,000 * ounces of gold (including both Treasury and Federal Reserve Bank holdings, which for the purpose of this article can be considered as one and called "United States gold"), worth at $35 per oz. over fourteen billions ($14,511,224,997).

Since the United States established the $35 price (February 1, 1934) and up to December 30, 1938, the net purchases of the United States have been about 219,000,000 oz. of gold, worth, at $35 per oz., about $7,665,000,000.

The total world production of gold from 1934 to 1938, both inclusive (estimating 1938 at 110 percent of 1937), was 168,813,000 oz.

Stated otherwise, in the five-year period since the price of gold was made $35 per oz., the United States has bought the equivalent of the entire new mine production of gold, plus about 50,187,000 oz. from gold previously mined, worth at $35 per oz. $1,756,545,000.

In terms of percentage, the United States has bought an equivalent of about 130 percent of the entire gold production of the world since January 1, 1934, without any deduction for use in the arts. If such deduction were made, it is probable that in terms of percentage the United States has bought the equivalent of over 140 percent of the entire gold production of the world since that date.

The amount of monetary gold remaining in other countries of the world (excluding that of Russia, which is not known, but about which enough is known to justify the conclusion that it cannot materially change the picture) is less than $12,000,000,000. (See Schedule A.)

About 87 percent of current new gold production of the world comes from outside the United States. About 54 percent of current new gold production of the world, including that of the United States, comes from the British Empire, chiefly from South Africa, Canada, and Australia.

It is interesting to note that of present holdings of over $14,000,000,000, about $7,000,000,000 could be disposed of and still leave the United States owning (1) substantially the same amount of gold owned at the time the price was raised to $35 per ounce on February 1, 1934; (2) an amount of gold equal to over 100 percent of money normally outstanding in circulation (only in the month of March, 1933, for a few days of the bank crisis, has money in circulation exceeded the total of $7,000,000,000); (3) over 27 percent of all the present monetary gold in the world, which probably is not far from what it should hold under such distribution of gold as will permit of a return to the use of gold as money at a uniform price by the leading nations of the world.

Obviously the United States, with more than half the monetary gold of the world, has more than its share and more than it needs for its own purposes. While such excess holding on the part of one nation continues, the restoration of any general use of gold as money by the nations becomes practically almost impossible, since there is not enough left to go around.

The excessive flow of gold to the United States has been due partly to normal payment of excess balances in trade, but more to flight of holders of currency of other nations to the United States dollar or United States securities, and most of all to the fact that the United States has bought all gold offered at $35 per ounce, thus pegging the price at that level, while other nations bought only intermittently and in very much less quantity than formerly.

There seems no present likelihood of such change in the international movement of gold as would reverse the tendency of the last few years, which has been especially marked in the last few months. It seems probable gold will continue to flow towards the United States so long as the latter continues to buy all offerings at $35 per ounce. This will increase present maldistribution of gold and aggravate the problem of restoring a uniform standard among nations in the future, meanwhile under the present system imposing upon the United States the burden of purchasing gold it does not want.

The United States cannot stop buying at $35 without lowering the value of what it already has, and worse still without precipitating a major disturbance in the already chaotic monetary and economic condition of the world, since the price of gold would at once become variable and probably fluctuate widely in price.

The problem above described will come prominently before the next Congress as it considers extending the existing powers of the President in regard to gold, which expire June 30, 1939.

The following plan is suggested in hope at least of stimulating further thought upon the problem.

(1) Congress would repeal the law prohibiting ownership of gold coin or bars by its citizens, thus reestablishing right of such ownership.

(2) The United States would continue to buy gold at the $35 price, less a mintage and handling charge, but, whenever it wished to avoid further accumulation, would pay therefor only with United States $10 or $20 gold pieces, or, for convenience, in gold certificates redeemable in gold coin to the appropriate extent.

Whether such gold coins are hoarded, are taken abroad by citizens of foreign countries, or are deposited in commercial banks, which in turn might redeposit in the Federal Reserve Bank—would be a matter of relative unimportance, since the gold, or its equivalent gold certificates, could be, when so desired, in private ownership and to that extent available to flow throughout the world as conditions require. Even if at times such gold coins, or equivalent certificates, should pile up in the Federal Reserve Bank,

* Daily statement of the U. S. Treasury for December 30, 1938.

they would nonetheless be available for reissue and recirculation as and when desired by commercial member banks, which in turn would reflect the needs or wishes of their customers.

The plan would not be a panacea for the presently existing problems in relation to gold. Nonetheless—

(1) It would end, whenever desired, further increase beyond the then existing gold holdings of the United States.

(2) It would end, when so desired, borrowing by the United States of money with which to buy gold, only to sterilize it, while paying interest on the borrowed money. It would also end the alternative method of buying in a way which increases reserves in the Federal Reserve Bank to an undesirable extent.

(3) It would maintain the existing price at not less than $35, which is highly desirable, until the attitude of leading nations of the world toward the money systems of the future becomes more defined, or cooperation of other nations in maintaining a uniform value of gold can be obtained.

(4) Gold has very little utilitarian value. Civilized man has always held gold in high esteem, for many centuries principally because he has considered gold the best protection for the individual against the monetary effects of war, revolution, insolvency of government—in short, all those factors which may depreciate, even destroy, the value of any fiat money, including "managed currency."

At present, no nation is minting and distributing new gold coins. In the United States, ownership of gold is prohibited, except in nonmonetary form—for example, jewelry. Gold tends to lose its ancient status as a protective possibility for the individual. Under such conditions, can it then long retain the position mankind has heretofore given it? This plan would end the period during which the individuals composing the rapidly increasing generation coming into active business and political life since February 1, 1934, have had little or no practical personal knowledge or experience with gold coin or even with gold bars. If we use the usual estimate of 25 years as the average life of a business generation, already 20 percent of such existing generation in the United States has no such experience, and if present conditions prevail for another seven and one-half years, this percentage will rise to 50 percent. A more or less similar tendency exists in most other countries.

Schedule A
Gold Reserves of Central Banks and Governments

The following table is compiled from the Federal Reserve Bulletin for December, 1938, page 1088, except as shown:

	Dollars	Date Gold Reserve Reported
United States*	$14,065,000,000	October 31, 1938
United Kingdom:		
Bank of England	$2,690,000,000	October 31, 1938
Equalization Fund**	758,940,000	September 30, 1938
France	2,428,000,000	October 31, 1938
Netherlands	1,008,000,000	October 31, 1938
Switzerland:		
National Bank	695,000,000	October 31, 1938
Bank for International Settlements	10,000,000	October 31, 1938
Belgium	562,000,000	October 31, 1938
Spain	525,000,000	October 31, 1938
Sweden	321,000,000	October 31, 1938
Italy	210,000,000	October 31, 1938
Canada	188,000,000	October 31, 1938
Rumania	129,000,000p	October 31, 1938
Argentina	435,000,000p	September 30, 1938
British India	274,000,000	September 30, 1938
South Africa	220,000,000	September 30, 1938
Japan	164,000,000	September 30, 1938
37 other countries†	1,074,000,000p	September 30, 1938 & October 31, 1938
Total of countries outside the United States, excluding Russia	$11,691,940,000p	
Total	$25,756,940,000p	

* According to the Daily Statement of the United States Treasury for December 30, 1938, the United States held $14,511,225,000, evidently having bought $446,225,000 since October 31, 1938. All estimates of monetary gold are necessarily approximate, because times of statements do not synchronize. Also, current mine production and constant transfers back and forth enter the picture. For example, the gain in United States gold of $446,225,000 just mentioned must, in part, have been at the expense of other nations. Part was mine production, which runs around $110,000,000 per month.

** *Wall Street Journal*, January 3, 1939, page 16.

† Includes Europe 17 countries excluding Russia, Latin America 10 countries, Asia and Oceania 6 countries, and Africa 4 countries.

p=preliminary.

(5) The plan would greatly decrease the present growing possibility that gold ultimately may cease to be the foundation of money systems and become a mere commodity.

(6) The plan does not affect the United States gold (over $14,000,000,000) presently held.

(7) The plan does not disturb existing relationships between the Treasury and the Federal Reserve Bank as to the gold presently held. It may or may not be used from time to time as further accumulation of gold by present methods seems undesirable or desirable.

(8) The plan is equally applicable to any change in the price of gold hereafter made pursuant to existing law.

1938 Activities

(*Continued from page 69*)

ductions for development expense by taxpayers electing percentage depletion. Briefs are being filed, and every effort made to protect the interests of mining in the further regulations which the Bureau is now preparing.

In general, we feel that the outlook in the 76th Congress is considerably better than in recent sessions. Examination of the 4,500 bills thus far introduced shows a noticeable lack of radical measures such as have characterized previous sessions. The committees which handle legislation of special importance to mining include men with a sound viewpoint of our problems. We are encouraged to feel that the present session of Congress will be a constructive one, that it may do some things to help the mining industry, and that it will not add greatly to the present burdens of productive enterprise.

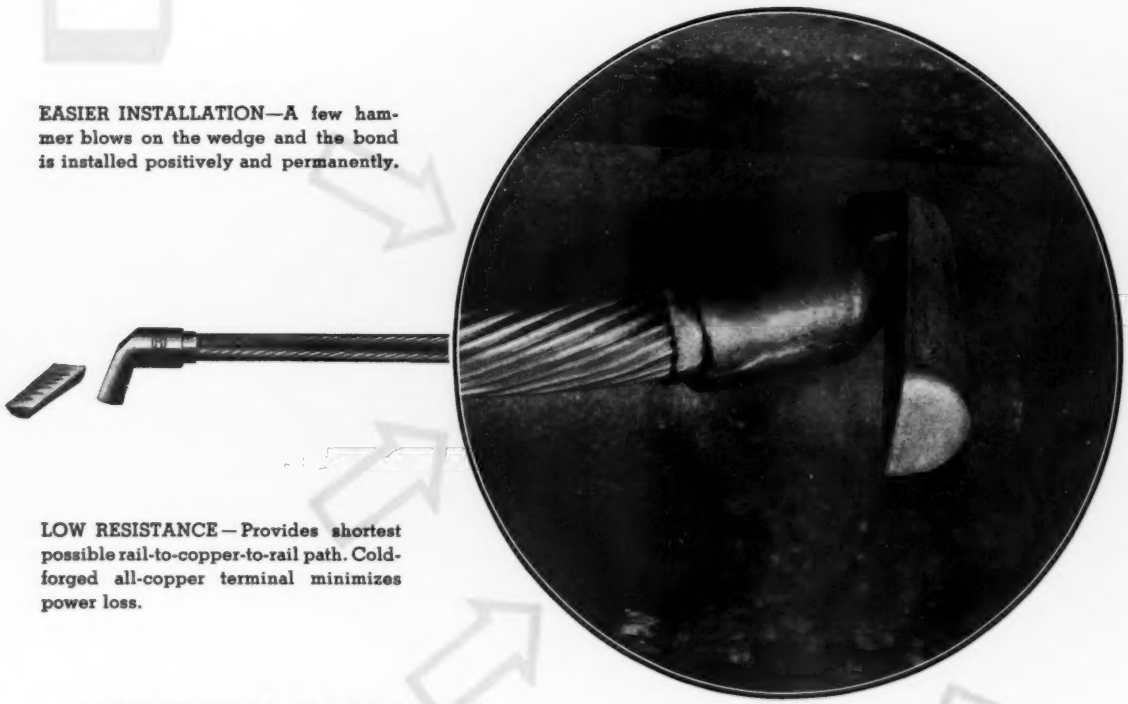
May I say for our entire staff that we deeply appreciate the solid support and cooperation extended by members of the mining industry, and that we have derived genuine satisfaction from the opportunity to serve this great industry.

Southern Illinois Coals, Inc., marketing agency for southern Illinois coal, is now in active operation with offices at 307 North Michigan Avenue, Chicago. Officers are E. R. Keeler, president of the Franklin County Coal Corporation, president; G. D. Cowin, president of the Bell and Zoller Coal and Mining Company, vice president; H. E. Stuart, secretary-treasurer.

TWO EASIER METHODS

THE NEW WEDGE BOND

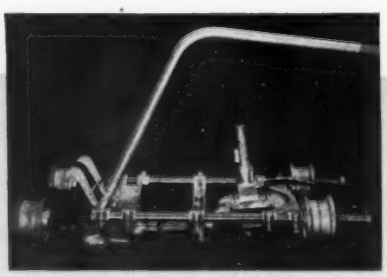
EASIER INSTALLATION—A few hammer blows on the wedge and the bond is installed positively and permanently.



LOW RESISTANCE—Provides shortest possible rail-to-copper-to-rail path. Cold-forged all-copper terminal minimizes power loss.

SPEEDY RECLAIMABILITY—Several hammer blows on the small end of the wedge, and the terminal is easily removed for inspection or re-installation.

LOW COST—"Overall length" need only be 6 inches longer than fish-plate. Economically installed and reclaimed.

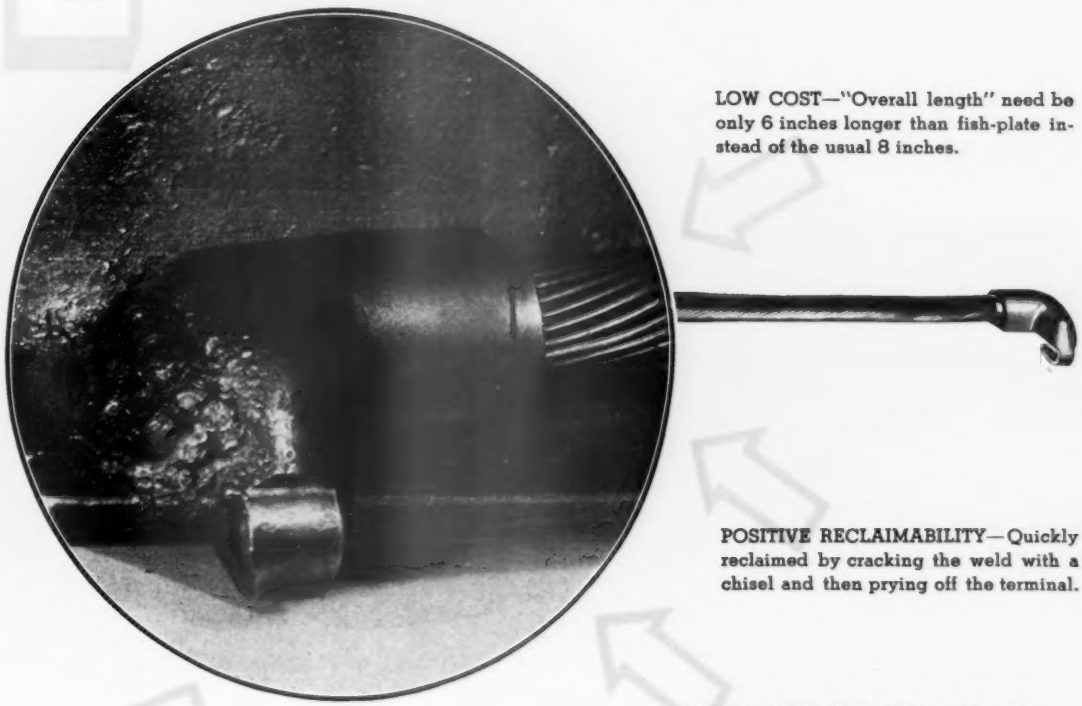


THE WEDGE-BOND RAIL DRILL

For properties who do not drill their rail to specification at the mill, O-B engineers have developed this high-speed portable electric rail drill, adjustable to all weights of rail. Both holes for a Wedge-Bond installation may be drilled in less than three-quarters of a minute.

TO BOND YOUR TRACK

THE NEW AW-20 STEEL ARC-WELD BOND . . . . .



LOW COST—"Overall length" need be only 6 inches longer than fish-plate instead of the usual 8 inches.

POSITIVE RECLAIMABILITY—Quickly reclaimed by cracking the weld with a chisel and then prying off the terminal.

EASIER INSTALLATION—Only 1¼ inches of weld per terminal are needed to provide an ample mechanical and electrical joint. Weld is made on easily accessible outside edge of terminal.

LOW RESISTANCE—Minimum length and short copper-to-rail path reduce power losses.

OHIO BRASS

50 YEARS OF SERVICE · FOUNDED IN 1888

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WHEELS of Government

● *As Viewed by A. W. Dickinson of the American Mining Congress*

AFTER the long lull following the adjournment of the 75th Congress on June 16, 1938, the legislative wheels of government again began turning with the convening of the 76th Congress on January 3, 1939.

On the second day of the session came the President's message on the state of the nation in which the chief stress was placed upon a call for additional national defense. On January 5 came the annual Budget message, which, without holding forth any hope for a balanced budget even by 1940, flatly stated that expenditures must be met by greater revenue and that such revenue will only be forthcoming through increases in the national income. Federal expenditures for 1939, the present fiscal year, are indicated at nearly 9½ billions of dollars and the deficit for this period is estimated at nearly 4 billion, making the public debt over 41 billion dollars on June 30, 1939. Estimated figures for the fiscal year 1940 indicate expenditures of nearly 9 billion dollars with a deficit of 3 1/3 billion and an estimated public debt on June 30, 1940, of nearly 44½ billions.

The first skirmish of the session came in the House when the Administration's $875,000,000 relief bill was reduced to $725,000,000 in the course of its passage. On the Senate side, despite strenuous efforts to restore the House cut, the bill was finally passed with the reduced appropriation, and in a crucial test of strength the McKellar amendment which would have restored the relief total to the amount asked by the President was defeated by the narrow vote of 47 to 46. It is reported that heavy pressure was brought upon Senators from their home states in a widespread and apparently organized effort to increase the relief appropriations.

Taxation

In Administration circles there is talk of the need of an additional $500,000,000 in revenue to meet extraordinary expenditures for national defense; but with no move indicated towards any attempt to balance the budget, it is possible that the additional money for national defense expenditures may be borrowed, thus making unnecessary the search for this additional revenue in the present session of the Congress.

In the meantime appointment of four Democrats and four Republicans to the Ways and Means Committee has been made. The Democrats are Boland of Pennsylvania, Maloney of Louisiana, McKeough of Illinois, and West of Texas. The new Republicans are Carlson of Kansas, Gearhart of California, Jarrett of Pennsylvania, and McLean of New Jersey. The present roster of the Committee on Ways and Means is as follows:

Democrats

Robert L. Doughton, *North Carolina*
Thomas H. Cullen, *New York*
Christopher D. Sullivan, *New York*
John W. McCormack, *Massachusetts*
Jere Cooper, *Tennessee*
John W. Boehne, Jr., *Indiana*
Wesley E. Disney, *Oklahoma*
Frank H. Buck, *California*
Richard M. Duncan, *Missouri*
John D. Dingell, *Michigan*
A. Willis Robertson, *Virginia*
Paul H. Maloney, *Louisiana*
Patrick J. Boland, *Pennsylvania*
Milton H. West, *Texas*
Raymond S. McKeough, *Illinois*

Republicans

Allen T. Treadway, *Massachusetts*
Frank Crowther, *New York*
Harold Knutsen, *Minnesota*
Daniel A. Reed, *New York*
Roy O. Woodruff, *Michigan*
Thomas A. Jenkins, *Ohio*
Donald H. McLean, *New Jersey*
Bertrand W. Gearhart, *California*
Frank Carlson, *Kansas*
Benjamin Jarrett, *Pennsylvania*

In the Senate the membership of the Finance Committee now stands as follows:

Democrats

Pat Harrison, *Mississippi*
William H. King, *Utah*
Walter F. George, *Georgia*
David I. Walsh, *Massachusetts*
Alben W. Barkley, *Kentucky*
Tom Connally, *Texas*
Josiah W. Bailey, *North Carolina*
Bennett Champ Clark, *Missouri*
Harry Flood Byrd, *Virginia*
Peter G. Gerry, *Rhode Island*
Joseph F. Guffey, *Pennsylvania*
Prentiss M. Brown, *Michigan*
Clyde L. Herring, *Iowa*
Edwin C. Johnson, *Colorado*
George L. Radcliffe, *Maryland*

Republicans

Arthur Capper, *Kansas*
Arthur H. Vandenberg, *Michigan*
John G. Townsend, Jr., *Delaware*
James J. Davis, *Pennsylvania*
Henry Cabot Lodge, Jr., *Massachusetts*

Progressive

Robert M. La Follette, Jr., *Wisconsin*

It is understood that there will be no conclusions reached concerning a Revenue Bill of 1939 until after March 15, at which time the tax returns will become available to the Treasury Department.

On January 30 Chairman Doughton (Dem., North Carolina) of the House Ways and Means Committee, named Representative Cooper (Dem., Tennessee) chairman of a subcommittee to handle all tax legislation. Other members are Representatives McCormack (Dem., Massachusetts); Disney (Dem., Oklahoma); Buck (Dem., California); Duncan (Dem., Missouri); Boehne (Dem., Indiana); Treadway (Rep., Massachusetts); Crowther (Rep., New York); Reed (Rep., New York); and Woodruff (Rep., Michigan).

Foreign Trade Agreements

The heavy cut in the duty on zinc suffered by the industry in the Canadian treaty has met repercussions in the attitude of the sugar and wool growers. An unofficial and premature announcement by Colonel Batista of Cuba, of a sugar agreement made with our government officials, resulted

in a one-day hearing before the Senate Finance Committee. Senators charged that bases for foreign trade agreements were being reached without complying with the law which requires notice of intention to negotiate an agreement and the holding of hearings for interested industries. At the Finance Committee hearing Secretary of State Hull is reported to have flatly denied that any agreement or even bases of agreements had been reached with Cuba.

Under the present Foreign Trade Agreement procedure stockmen fear concessions to the Argentine, and wool-growers are concerned over a possible trade agreement with Australia. As a result of the feeling in the Senate a resolution (S. Res. 69) has been introduced by Senator Joseph O'Mahoney of Wyoming, and referred to the Committee on Finance. It reads as follows:

"*Resolved*, That it is the sense of the Senate that foreign trade agreements entered into under the Act, entitled 'An Act to Amend the Tariff Act of 1930,' approved June 12, 1934, are treaties which under the Constitution can be made only by and with the advice of the Senate; and, there being nothing in such Act which provides that such agreement should not be ratified by the Senate as other treaties are ratified, it is the sense of the Senate that such agreements should be made effective only if the Senate has advised and consented to their ratification."

Passage of such a resolution would be a first step toward amendment of the Trade Agreements Act to require Senate ratification. Even without such amendment, the resolution itself would apparently serve as a deterrent to further trade treaties consummated without the consent of the elected representatives of the people.

Strategic Minerals

With the present pronounced interest in national defense the attitude of the Federal Government toward the strategic and critical minerals, as classified by the War Department, is of real importance. A number of bills have been introduced in the House and Senate calling for the purchase of such materials as a national defense measure, and for programs of search and development to be carried out by the Bureau of Mines and the United States Geological Survey. A Minerals Advisory Committee has been appointed to function under the Assistant Secretaries of War and Navy and to assist the Army and Navy Munitions Board. Seventeen subcommittees have been appointed to cover the particular minerals affected and to consider the degree to which the nation can and should depend upon domestic supplies. Present members of the Mineral Advisory Committee are: C. K. Leith, chairman; Arthur S. Dwight, vice chairman; J. W. Furness, secretary; D. F. Hewett and Marshall W. Tuthill. Lt. Col. H. B. Rogers and Lt. Comdr. A. G. Finch, of the Army and Navy Munitions Board, will act as liaison officers between the Minerals Advisory Committee and the Board.

Wage-Hour

Administrator Elmer Andrews will apparently receive from the first deficiency bill the appropriations which he considers necessary to carry out the administration of the Fair Labor Standards Act of 1938. This will result in immediate establishment of the 12 regional offices of the Wage-Hour Administration, and soon thereafter prosecutions will be made and court tests secured which the Administrator feels are necessary to the carrying out of the Act's provisions.

In the middle of January the National Labor Relations Board made announcements concerning the certification of labor organizations as bona fide for purposes of securing an averaging-of-hours provision for an industrial enterprise. Section 7 (b) of the law provides that employers can exceed the 44-hour work-week without paying overtime if the labor board certifies as bona fide the representatives of the workmen who have entered into a collective bargaining agreement providing for not less than 1,000 hours of work in 26 weeks or 2,000 hours in 52 weeks. The National Labor Relations Board has stated that it will certify an applicant labor organization as bona fide under the following circumstances:

(1) Where the labor organization has been certified by the Board as a collective bargaining representative of the employes pursuant to section 9 of the National Labor Relations Act; or

(2) Where the applicant is a local of an international or parent organization which has been certified by the Board as a collective bargaining representative of the employes pursuant to section 9 of the National Labor Relations Act; or

(3) Where any local of an international or parent organization with which the applicant is affiliated has been so certified as a collective bargaining representative pursuant to the National Labor Relations

In the Lincoln Memorial at Washington, D. C.

Photograph by Charles Cole Simpson.

Act, such certification shall be sufficient basis for certification of bona fides under the Fair Labor Standards Act for any local of the same international.

The mining industry's need for a six-month averaging-of-hours provision in the law is evidenced by the following words of Senator Pat McCarran of Nevada on the floor of the Senate on January 28:

SENATOR MCCARRAN: "We have miners who work six days a week, eight hours a day. Suppose those miners are working a hundred miles from some center. They do not want to have their hours limited, but their hours are limited by force of law. They do not want those hours limited, because they have nothing to do with the hours of idleness. They can't go anywhere. They can't do anything. They are simply idle. What is more than that, our metalliferous mines work three shifts of eight hours, which means continuous operation throughout the entire 24 hours of the day. We have destroyed that whole program and we have reduced the paycheck of the miner."

SENATOR BARKLEY: "It may be that life has simmered down to a dull affair, so that there is nothing to attract them."

SENATOR MCCARRAN: "There is nothing to attract them except $20 gold pieces."

SENATOR WHEELER: "I think the Senator from Nevada is correct. The same complaint has been made to me by miners and smelter men in my state. The wages and hours law has upset the whole standard by which they were employed, and there has been much confusion. I am told that in some instances the loss has amounted to as much as 25 or 30 dollars a month."

While Administrator Andrews has stated that he expects ultimately to submit amendments to the existing law, he points out that there is not enough experience in the administration of the Act upon which to base recommendations for amendments at this time. The first desire of the wage-hour officials is for court interpretations of the Act.

National Labor Relations Act

Late in January Senator David I. Walsh, of Massachusetts, introduced S. 1000 which carries the amendments proposed by the American Federation of Labor. Briefly these amendments would:

(1) Deny the Labor Board power to impair or nullify agreements between employers and employes, unless such agreement: (a) is with a company union, or (b) requires as a condition of employment, membership in a labor organization which, at the date of the execution thereof, is not the exclusive bargaining agent of the employes covered thereby, or (c) which deprives the representative designated by a majority in an appropriate unit of the right exclusively to bargain for the employes in such suit.

(2) Approve craft units of one or more employes; provided, that an appropriate unit shall not embrace employes of more than one employer. Two or more units may, by voluntary consent, bargain through the same agent or agents with an employer or employers, their agent or agents.

(3) Authorize employers to petition the Board to investigate controversies and to conduct elections by secret ballot of employes.

(4) Make it plain that employers are not prohibited from talking with employes, with respect to matters of mutual interest, provided that expressions of opinion are not accompanied by acts of discrimination or threats.

(5) Allow any party to a hearing to charge trial examiner with bias or partiality, for disqualification of the examiner.

(6) Allow any party to investigations or proceedings, access to any evidence in possession of Board that relates to any matter under investigation or in question.

(7) Limit the time within which the Board must take action on certification hearings and on decisions.

(8) Direct the Board to give notice of investigations and hearing to all known interested parties.

(9) Provide that examiners and other agents, whose functions are to conduct hearings, shall not be under 20 years of age and shall be selected and assigned with due regard for the impartiality, disinterestedness, judicial temperament, and their knowledge of the rules of evidence. In the conduct of proceedings they shall at all times maintain an impartial, unbiased and judicial attitude toward the parties, witnesses and issues involved.

(10) Provide that the findings as to the facts, if supported by *substantial and credible* evidence, shall be conclusive in the courts.

Senator Burke, of Nebraska, who has severely criticized the National Labor Relations Act and its administration, is reported to have expressed approval of the American Federation of Labor amendments and to have said that he expects to offer further amendments which will separate the judicial from the investigative functions under the Act.

Monetary Policy

On January 19 the President sent a message to the Capitol requesting the extension to January 15, 1941, of the powers conferred by Section 10 of the Gold Reserve Act of 1934 which permits the Administration to use the two-billion-dollars stabilization fund. The message also asked a similar extension of the powers specified in Section 43 (b) (2), Title III of the AAA Act approved May 12, 1933, which provides the authority to fix the weight of the silver and gold dollar. Immediately Senator Pittman, of Nevada, introduced a bill to amend the Silver Purchase Act of 1934 and to provide for purchase of domestic mined silver at $1.29 per ounce. Senator Pittman's bill also provides for foreign purchase of silver, but only in exchange for American-produced goods.

A plan of the American Mining Congress, made public a few days before the President transmitted his message, calls for restoration of the rights of citizens to possess gold and for payment by the Treasury in gold coin or gold certificates for new gold purchased whenever it deems further increase in the present gold reserves of the United States Government inadvisable. This is presented in full on pp. 70-71.

The President's proclamation of December 31, 1938, on the price to be paid for domestic silver up to June 30, 1939, maintained the price at 64.64 cents per ounce. Until the proclamation was supplemented by new regulations from the Treasury Department under date of January 16, it appeared that a physical delivery of the silver would be required to receive the benefit of this price. The regulations now provide also for the acceptance by a United States Coinage Mint "of a duly executed instrument of transfer on an approved form covering such silver," thus extending the benefits of the proclamation to silver in ore at the smelter bins. However, due to the time consumed in transmitting miners' affidavits and instruments of transfer to the coinage mint and in securing execution of the transfer agreement, it still appears that a large part of the June mine production of silver or even some of the silver mined prior to June 1, 1939, may not receive the benefits of the existing 64.64 cents price.

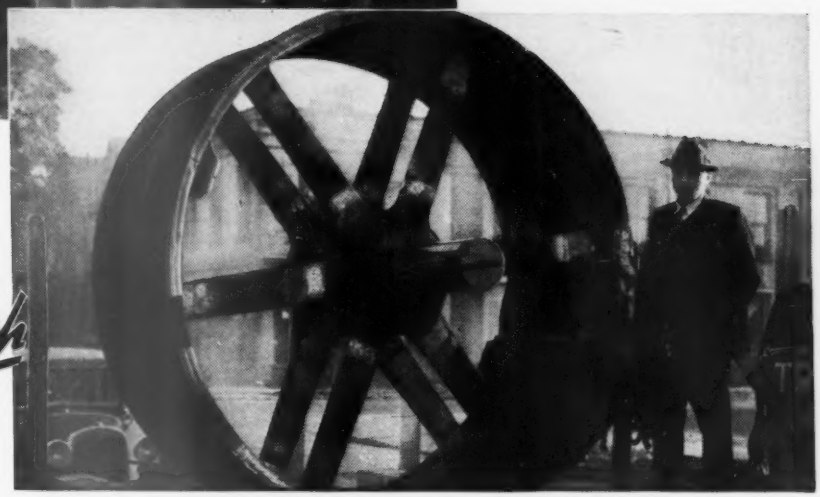
Stream Pollution

Bills similar to H.R. 2711, the Vinson bill of the last Congress, have been introduced by Senator Barkley, of Kentucky, Representative Spence of Kentucky, and by Representatives Parsons of Illinois, and Bland of Virginia.

The Barkley-Spence bill, which appears the one most likely to be acted upon, meets the objection of the President to the Vinson bill of last year by providing budgetary control over loans and grants-in-aid. As first introduced, the Bland bill contained the Lonergan amendments of last year, but it is understood that Representative Bland had no intention of embodying such police powers for the Federal Government, and he quickly introduced another bill which is practically the same as the Barkley-Spence measure. It is considered likely that there will be a stream pollution bill passed by this session of the Congress.

In pieces October 6th

Back on the job October 12th



THANKS TO TOBIN BRONZE!

THE whole town of Austin, Pa., depends upon this pulley for food. It turns the wheels of The Bayless Pulp & Paper Company's mill and most everybody in Austin works for Bayless.

Recently, the shaft to this 84" pulley snapped between the two sets of wheel spokes, breaking all twelve spokes away from the hub and all but three away from the rim.

The plant was paralyzed . . . delivery of a new wheel would take from four to six weeks! Some one suggested welding. The idea seemed fantastic but the Bayless Company went to Hebeler Welding Company, of Buffalo.

The pulley was rushed to Buffalo, repaired with Tobin Bronze, sent back and re-installed —all within six days. Weeks of disastrous shut-down were averted and the cost of a new casting saved.

When difficult welding jobs appear, nothing equals Tobin Bronze! This time-tried Anaconda product carries the trade-mark "Tobin Bronze Reg. U.S. Pat. Off." on each rod. Look for this mark and be sure you're getting genuine Tobin Bronze.

ANACONDA from mine to consumer 37355

Anaconda Welding Rods

THE AMERICAN BRASS COMPANY • General Offices: Waterbury, Connecticut

Offices and Agencies in Principal Cities • In Canada: ANACONDA AMERICAN BRASS LTD., New Toronto, Ont.

NEWS and VIEWS

Michigan Iron Mines Resume Operation

Several iron ore mines in the Upper Michigan field resumed operations on December 1, while other mines boosted working schedules. The Penokee Ore Company started production at its Pabst and Aurora mines on three-day weekly schedules, returning some 300 men to work. The mines had suspended work last July 1.

At Iron River, 270 men returned to work when the Bengal and James iron ore mines of Pickands, Mather and Company, idle for the past six months, resumed operations.

Operations that increased their working schedules from three to four days per week late in November included the Cliffs shaft mine of the Cleveland-Cliffs Iron Company at Ishpeming; and at Michigan mines of the Montreal Mining Company, the Youngstown Mining Corporation and the Oliver Iron Mining Company.

Safety In Steel

Such is the title of a very attractive pamphlet recently issued by the American Iron and Steel Institute. After outlining briefly the story of the safety movement in steel, which had its inception about 30 years ago, the bulletin presents very effectively, by means of photographs, drawings and brief text, the highlights of the steel industry's unceasing efforts to achieve safety, and its fine record of results. Since 1907, the bulletin states, the accident hazards, as measured by the number of accidents for each million man-hours worked, has dropped nearly 90 percent, and the standard is toward a still better record. At the end of 1937, the safety record of the steel industry was nearly 40 percent better than that reported for all industries by the National Safety Council. Last year steel stood fifth among the 30 major industries in relative freedom from accidents, having risen to that position from twelfth place within three years.

T. C. I. Ends Deduction System For Store Purchases

Drastic changes in handling payroll deductions for mercantile store purchases and other company services were announced early in December by the Tennessee Coal, Iron and Railroad Company.

Commencing January 1, 1939, all Tennessee Company mercantile stores will be operated on a strictly cash basis, except for extension of credit in accordance with its usual methods of merchandising. This means that the practice of issuing store orders to employes will be discontinued. No exceptions will be made, even in the case of employes receiving above the 45-cent-an-hour minimum prescribed under the Walsh-Healey Act.

In the case of employes earning above the 45-cent minimum, deductions will be made in preferred order to the extent the worker earns above the minimum, except that all store orders have been abolished in favor of credit. Payroll deductions, according to the Tennessee Company notice, will be made in the case of those employes earning in excess of 45 cents an hour, first for group insurance; second, medical fees; third, rent and other less important services so long as the deductions do not interfere with the minimum.

+ + +

New Feature at Coal Convention

OPERATORS' EXHIBIT

An entirely new feature to be inaugurated this year at the Coal Convention of the American Mining Congress will be an exhibit at Music Hall where employes of coal companies will show devices or "operating kinks" which they have designed for some local need. Many of these devices have a wide application, and it is the purpose of this display to encourage further inventive effort.

There will be no entry charge, and detailed plans will be announced later. In the meantime, send your suggestions for entries to the American Mining Congress at Washington.

+ + +

Powdered Lead In Bearing Grease

Recent experiments with powdered lead in bearing greases have indicated what might prove to be another important use of this metal to augment the already varied and extensive purposes for which it is employed. The experiments were conducted under actual operating conditions on an 8-cu. ft. gold dredge, the relative merits of regular and leaded lower tumbler greases having been carefully compared. From figures obtained, it was estimated by the field manager of the dredging company that the life of the bearing was increased from 60 to 150 days by using leaded grease.

Potash Export Assn. Formed

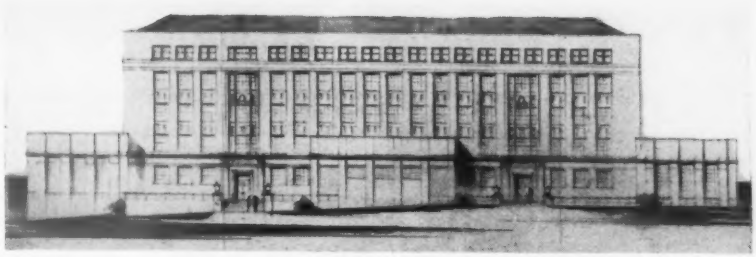
The Potash Export Association, Inc., has filed papers with the Federal Trade Commission, under the Export Trade Act (Webb-Pomerene law) for exporting potash (potassium chloride, potassium sulphate, sulphate of potash magnesia, kainit, and manure salts). The association will maintain offices at 21 East 40th St., New York.

Officers of the association are Dean Clark, president; Paul Speer, vice president; and Fred N. Oliver, secretary. Directors are Dean Clark, Paul Speer, Horace M. Albright, F. Cecil Baker, G. F. Coope, J. B. Grant and Frederic Vieweg.

Members are American Potash & Chemical Corporation, 70 Pine St., New York; United States Potash Company, 30 Rockefeller Plaza, New York; and Potash Company of America, First National Bank Building, Denver.

The Export Trade Act grants exemption from anti-trust laws to an association entered into and solely engaged in export trade, with the provision that there be no restraint of trade within the United States or restraint of the export trade of any domestic competitor, and with the further prohibition of any agreement, understanding, conspiracy or act which shall enhance or depress prices or substantially lessen competition within the United States or otherwise restrain trade therein.

Proposed Mineral Industries Building for West Virginia University



The following digest of an article written by William D. Evans, Jr., of the *Fairmont Times* for the West Virginia University Alumni Magazine, is a clear and concise statement of the importance of obtaining approval of this project in the present legislative session. It also pays fitting tribute to the splendid work done by Acting President Charles E. Lawall, who, as director of the School of Mines since 1930, has clearly demonstrated his fine administrative ability in building up the School of Mines to the prominent position it now holds.

"With coal beds running the length and breadth of the State, with vast pools of oil, great formations of gas-bearing sands, huge deposits of limestone, sand and gravel, clays, dimension stones, even iron ore and manganese, perhaps no similar area in the country has greater possibilities of scientific development.

"For at least a decade, there has been growing the feeling that West Virginia and its people should no longer allow the exploitation of its natural wealth for the gain of others. On every hand we hear of the possibilities of research. Two full days recently were devoted at our University to studies in the possibilities of coal alone, and the potential development of our greatest single resource staggers the imagination.

"These ideas finally have culminated in the proposal by the West Virginia University Board of Governors that a new Mineral Industries Building, capable of serving the teaching and research needs of the State for a long period to come, be built on the campus of the University.

"Plans for that building have been drawn (see Cut), and when the State Legislature convenes in Charleston early in January, bills will be introduced asking for suitable appropriations needed for its construction.

"If the State, through the Legislature, indicates by appropriations its willingness to advance the cause of training and research, there is every reason to believe that substantial assistance may also be obtained from the Federal Government.

"Those most interested in the Mineral Industries Building believe, however, that if the State appropriates about $427,500, the remainder of the funds for the proposed $777,400 building may be obtained through PWA. An application has been made to PWA for more than a third of a million dollars, but its approval cannot be forthcoming until the sponsor's share has been definitely assured.

"These figures sound large in terms of $1.50 coal, but the cost of a smaller structure sought in 1927 was more than the Legislature will be asked to appropriate early in 1939. The building then planned would have housed only the School of Mines and the department of chemical engineering, still cramped in out-moded quarters in dangerously-old Mechanical Hall. The new Mineral Industries Building is designed to include both these branches of the University, the Department of Geology, the Mining Extension Division, and the State Geological Survey, with research and training quarters in oil and gas, ceramics, and every other allied science which has to do with the natural resources of the State.

"West Virginia University has had no new building except dormitories, largely constructed with Federal funds, since the now-crowded Chemistry Building was finished in 1926. Its enrollment has increased this year to an all-time record, and with 63 students in the School of Mines alone, that branch has grown by more than 300 percent since the 1933-34 term, only five years ago.

"Acting President Charles E. Lawall, who has been Director of the School of Mines since 1930, and who has watched its development and realized the ever-growing needs for trained men who can combat economic as well as physical problems of the largest industry in the State, recently asserted to the writer that the accrediting committees which rate the colleges and universities of the country are beginning to look on West Virginia's physical plant with askance. To maintain the University's present position in college ranks, added facilities are vital.

"Hardly had the tentative plans been drawn and the idea started to spread through the State than one group after another rushed to the support of the Mineral Industries Building proposal. The West Virginia Coal Mining Institute, virtually every one of the seven regional institutes which have met before this writing, the West Virginia Society of Professional Engineers and many of their county branches, and the Appalachian Geological Society are in the battle line and will urge their friends in the Legislature to approve the building.

"Governor Homer A. Holt, although he has not spoken publicly on the subject, is known to consider the need to be great for such a building, and that such a need is particularly important for a State so rich in mines and minerals as West Virginia.

"What the Legislature may do, of course, necessarily will depend on prospects of revenue for financing the building. So far as the alumni of West Virginia University in and out of the halls of the Legislature are concerned, you may rest assured the law-makers will have an opportunity to study the situation.

"Given a modern, efficiently operating building, there is reason to believe that research workers might relieve harassed coal, oil and gas producers and find sufficient new sources of revenue from the other minerals of the State as to more than equal the cost of the building in less than the time required for its construction. And that West Virginia University would have for years adequate quarters for training students to solve the State's problems with respect to Mineral Industries alone would be sufficient reason for the building.

"It is an opportunity which was never brighter, may never return, and which should not be missed."

Keen Interest In Randsburg Area Continues

Interest that may rival the excitement in the Golden Queen discovery at Mojave in 1934 continues to draw miners from many districts to Randsburg, Calif., to locate, buy or lease neighboring gold properties. Within the past several months five successive discoveries on alternating sides of the mineral break separating quartz monzonite and schist have produced 10 separate millings of free gold ore claimed to run from $20 to $50 per ton. Other prospects are said to show exceptional surface values, with indications pointing to additional discoveries.

Utah Copper and Anaconda Reduce Copper Output

A 10 percent reduction in output with an accompanying 10 percent lowering in employment, effective in mid-January, was announced by D. D. Moffat, vice president and general manager of the Utah Copper Company, operating the huge open-pit mine at Bingham, Utah.

The curtailed operations may mean the laying off of about 330 men, it is said, and reduction in ore output of 35,000 to 40,000 tons per week. A corresponding reduction in operations at the company's Magna and Arthur mills will result.

At about the same time the Anaconda Copper Mining Company announced suspension of operation at its Leonard mine in Butte, Mont. This suspension is said to take about 950 workers off the pay roll.

Anaconda also announced curtailment of operations at two zinc smelters at its Washoe plant in Montana.

Revelation of Coal Cost Data Upheld By Supreme Court

The United States Supreme Court on January 30 upheld the National Bituminous Coal Commission's contention that Section 10 (a) of the Bituminous Coal Act of 1937 permits the Commission to make available for inspection and for introduction into evidence in hearings, the reports concerning costs which have been made to the Commission by coal code members.

This decision was brought about through court action of the Utah Fuel Company and a score of other producers who contended that the law prohibited revelation of the data, and asserted that inspection of the costs and cross-examination were not necessary to fulfill requirements for due process. The coal producers were denied an injunction against the Commission in the United States District Court for the District of Columbia on September 8, 1938. The case was then taken to the United States Court of Appeals for the District of Columbia who upheld the Commission and sustained dismissal of the case by the Distict Court. Producers appealed to the United States Supreme Court and the case was heard on January 3, 1939.

In its ruling, the highest court in the land pointed out that this type of action by the Commission harmonizes rather than conflicts with the general purposes of the Act to permit action only upon full information.
The Court said:

"By admission, Congress could have authorized the Commission to disclose the detalis of reports concerning costs, etc. But petitioners insist that the Bituminous Coal Act conferred no such power; on the contrary definitely denies it.

"The Act contains 21 sections and a schedule of districts. Section 4—'The provisions of this section shall be promulgated by the Commission as the "Bituminous Coal Code," and are herein referred to as the code.' 'Part II—Marketing' of this declares—

" 'The Commission shall have power to prescribe for code members minimum and maximum prices, and marketing rules and regulations as follows:

" '(a) All code members shall report all spot orders to such statistical bureau hereinafter provided for as may be designated by the Commission and shall file with it copies of all contracts for the sale of coal, copies of all invoices, copies of all credit memoranda, and such other information concerning the preparation, cost, sale, and distribution of coal as the Commission may authorize or require. All such records shall be held by the statistical bureau as the confidential records of the code member filing such information.

" 'For each district there shall be established by the Commission a statistical bureau which shall be operated and maintained as an agency of the Commission. . . .'

"Section 10 (a)—

" 'The Commission may require reports from producers and may use such other sources of information available as it deems advisable, and may require producers to maintain a uniform system of accounting of costs, wages, operations, sales, profits, losses, and such other matters as may be required in the administration of this Act. No information obtained from a producer disclosing costs of production or sales realization shall be made public without the consent of the producer from whom the same shall have been obtained, except where such disclosure is made in evidence in any hearing before the Commission or any court and except that such information may be compiled in composite form in such manner as shall not be injurious to the interests of any producer and, as so compiled, may be published by the Commission.'

"Counsel submit an ingenious argument to show that as petitioners are code members their returns to Order 15 are not within the ambit of section 10 and must be treated as if presented under Section 4, Part II (a) and therefore confidential. Also, that the challenged action of the Board conflicts with the words, spirit and general purposes of the enactment.

"We have examined the argument but cannot conclude that the reasons advanced are adequate to support the point taken.

"The language of section 10 (a) applies to all producers and we think allows what the Board proposes. It harmonizes rather than conflicts with the general purposes of the statute to permit action by the Board only upon full information. Obviously publication may be harmful to petitioners but as Congress had adequate power to authorize it and has used language adequate thereto we can find here no sufficient basis for an injunction."

The Coal Commission is now in the final stage of determining minimum prices and marketing rules and regulations.

Representatives of producers in the Appalachian and Michigan field now are "coordinating" marketing rules and basic "at the mine" prices. Rocky Mountain and Pacific Coast producers have completed this step for practically all of the markets they serve, except where they compete with Mid-Western producers. "Coordination" of Mid-Western prices will get under way just as soon as the Commission completes work on proposed schedules for Indiana, Illinois, Iowa and western Kentucky.

Following "coordination," the Commission will hold a final hearing before making the prices and regulations effective.

Kentucky Coal Marketing Agency Formed

A new regional coal marketing agency—Kentucky Coal Agency, Inc.—was established January 3 with headquarters in Madisonville, Ky. Having been given provisional approval recently by the National Bituminous Coal Commission, the new organization represents the producers of the Western Kentucky coal fields. Herbert C. Moore, formerly of the marketing division, Appalachian Coals, Inc., is president of the organization, having been elected to that position by the board of directors on December 15.

16 Billions for Armaments In 1938

A recent dispatch from Geneva states that the world's 1938 military expenditures bill was estimated about $16,000,000,000 by the League of Nations Armaments Yearbook. The Yearbook estimated that the costs last year exceeded those of 1937 by $2,500,000,000.

Seven great powers—the United States, Great Britain, Germany, France, Italy, Japan and the Soviet Union—accounted for 78.7 percent of the total, with expenditures estimated at $12,528,000,000.

12th Annual Mining Institute of Washington College of Mines

The Twelfth Annual Mining Institute of the College of Mines, University of Washington, Seattle, was held January 16-January 21.

Discussions during the first four days were devoted to mining, quarrying, milling and ceramic industries of the State of Washington, with a trip to the open-hearth steel furnaces and mill of the Bethlehem Steel Company on Saturday morning.

One full day was devoted to a consideration of Washington coal and its utilization in resident-type stokers. A joint dinner with the North Pacific Section of the American Institute of Mining and Metallurgical Engineers was held Tuesday, at which Prof. Richard A. Lester spoke on "Labor Relations in the Mining Industry." At the luncheon on January 19 the Student Mines Society presented speakers in a program dealing with mining in the West.

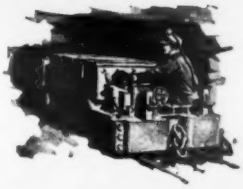
Special speakers for the Mining Institute included: William S. Barquist, Paul T. Benson, E. G. Easterly, J. B. Fink, Duncan Gregg, Maj. S. E. Hutton, K. A. Johnson, Frank Metler, H. A. Pearse, Harry A. Shaw and R. J. Tremblay.

Dean Milnor Roberts led the nine members of the university staff on the program with an address on "Review of Mining."

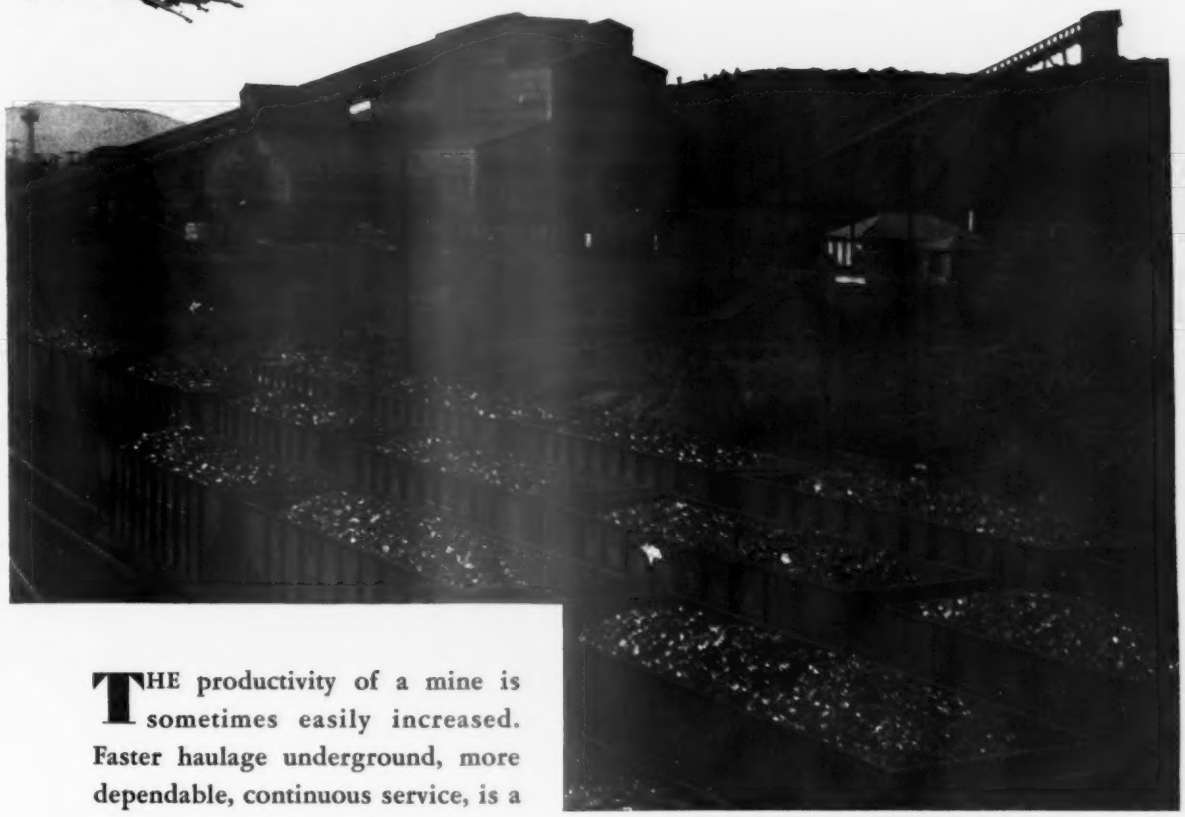
Annual Meeting of New River Operators Association

The thirty-sixth annual meeting of the New River Coal Operators Association was held December 13 at the Hotel Mountainair, Mt. Hope, W. Va.

At the business session the following officers were selected for the ensuing year: President, Gilbert Smith; vice president, P. C. Thomas; treasurer, P. M. Snyder; secretary-traffic manager, S. C. Higgins.

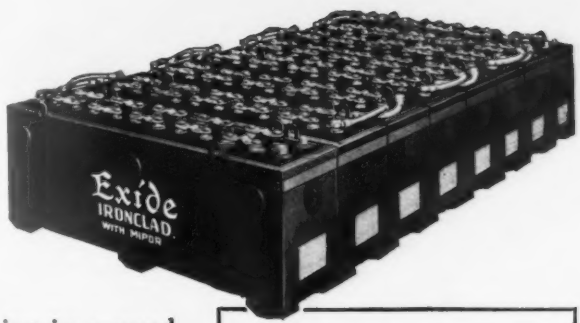


More miles per hour underground mean more tons per day at the tipple



THE productivity of a mine is sometimes easily increased. Faster haulage underground, more dependable, continuous service, is a sound means of producing more coal per day.

Battery locomotives, powered by Exide-Ironclads, provide speedy and trouble-free haulage service. And the reason lies in the exceptional performance of these batteries.



They can deliver almost unlimited power when needed—ample for unusual loads and grades. They maintain a good voltage, hence good haulage speeds, all day. Their dependability minimizes interruptions and delays. And their life is so long that the overall cost is kept exceedingly low.

Write today for free booklet, "The Storage Battery Locomotive for Underground Haulage."

Exide
IRONCLAD
BATTERIES
With Exide **MIPOR** Separators
"MIPOR," Reg. U. S. Pat. Off.

THE ELECTRIC STORAGE BATTERY COMPANY, Philadelphia
The World's Largest Manufacturers of Storage Batteries for Every Purpose
Exide Batteries of Canada, Limited, Toronto

New Secondary Metals Section Of Bureau of Mines

The establishment of a Secondary Metals Section of the Bureau of Mines, United States Department of the Interior, at Pittsburgh, Pa., with James S. Earle, of Plainfield, N. J., as supervising engineer, was announced January 17.

The creation of a section to deal exclusively with secondary metals, Dr. John W. Finch, Director of the Bureau of Mines, stated was necessitated by the constantly increasing importance of scrap as a factor in metal

JAS. S. EARLE

supply and by the growing demand upon the Bureau of Mines for authoritative information in this field. Bureau officials have long recognized that the stock of metals in use and the scrap returning to industry constitute a great national resource, and that the formulation of a sound public policy with respect to raw material supply is dependent upon a thorough understanding of the secondary metal problem. Not only is the scrap industry itself in need of more frequent and detailed data than have heretofore been available, but the rapid growth of secondary metal production is exercising a profound influence on mining which is too little understood by reason of insufficient data. In the light of these facts, Dr. Finch pointed out that a thorough knowledge of the extent and industrial incidence of secondary metal production was highly essential to the regular flow of current supplies as well as to the effective conservation of irreplaceable national resources. Although annual statistics on the production of secondary metals of the nonferrous group have been compiled over a period of 30 years, it is only now that funds have become available for regular coverage of the vast resources of ferrous scrap that annually return to the industrial cycle.

The various fact-finding activities of the Bureau in regard to scrap will be consolidated in the new section and expanded as need and opportunity arise. Director Finch also stated that in this action the Bureau of Mines was realizing an ambition of many years standing to increase its usefulness to this important branch of the mineral industry.

Mr. Earle has had 13 years' practical experience as a metallurgist, a large part of which has been in the purchase, sorting, and treatment of scrap metals. Following his graduation from the University of Arizona in 1925 he was engaged in the design, construction, and operation of various copper and lead smelters. In 1929 he was appointed assistant superintendent and in 1932 superintendent of the lead refinery of the American Smelting and Refining Company at Monterrey, Mexico. In 1934 he was transferred to Perth Amboy to take charge of sorting and remelting scrap metals for the Federated Metals Corporation. Subsequently he was put in charge of the scrap smelting and refining operations at the same plant. Mr. Earle is well acquainted with the marketing and technologic aspects of the secondary metal industry and has originated several improvements in methods of treating various types of scrap.

+ + +

Metal Mining Convention

Salt Lake City has been selected as the site for the Sixth Annual Metal Mining Convention and Exposition under the auspices of the Western Division of the American Mining Congress. The industry meeting will be held from August 28 to 31, 1939.

As in the case of the successful 1937 Convention and Exposition, the meeting will again be held in the Minerals Building at the Utah State Fair Grounds, where improved arrangements for the meeting room and exhibit space have been worked out. The central location for this important event, combined with the opportunity of visiting the Golden Gate International Exposition at San Francisco en route to or from the Convention, will undoubtedly result in another record attendance of mining men from all districts.

+ + +

Oregon Mining Association Makes Its Bow

Acting on the threat of a drastic anti-stream pollution measure, about 100 operators in the rapidly expanding Oregon mining industry met December 7 at Portland, Oreg., and organized the Oregon Mining Association. It is a state-wide organization, with its membership embracing mine owners, operators and those interested in all the branches of the mineral industries — metallics and non-metallics.

The meeting was called by Leverett Davis, vice president in charge of operations of Cornucopia Gold Mines, Cornucopia, Oreg. Mr. Davis presided at the meeting, and presented a short talk in which he explained the purpose of the organization.

Those present voted for the necessity of perfecting the organization, and proceeded with the election of the following officers: President, Leverett Davis; vice president, D. Ford McCormick, Medford, Oreg.; secretary-treasurer pro tem, F. Whalley Watson, Portland, Oreg.

Directors of the new organization include D. Ford McCormick, Leverett Davis and F. Whalley Watson, two-year terms; S. H. Williston, R. B. Porter, C. Hunt Lewis and Lawrence C. Newlands, all of Portland, one-year terms.

Earl K. Nixon, director of the State Department of Geology and Mineral Industries, in a brief talk to the gathering, promised a full measure of cooperation to the new association.

Chinese Appeal for Technical Reprints

A recent announcement from T. L. Yuan, acting director of the National Library of Peiping of Kunming, China, announces an urgent need for scientific literature to replace that lost in the deliberate destruction of universities and scientific institutions in recent and present military operations.

The library is endeavoring to build up a special reprint collection which will be of great value to investigators engaged in scientific research, and will greatly appreciate donations of books, reprints, periodicals, etc., from authors who may have copies to spare for this worthy cause.

Donations may be sent to the library care of the International Exchange Service, Smithsonian Institution, Washington, D. C., which makes monthly shipments to China.

Eagle-Picher Buys Commerce M. & R. Properties in Tri-State

Sale of the extensive mining properties of the Commerce Mining and Royalty Company of the Kansas-Oklahoma section of the Tri-State Zinc and Lead District, to the Eagle-Picher Mining and Smelting Company of Joplin and Cincinnati, was announced December 29 by officials of the Commerce Company at Miami, Okla., where the deal was completed.

The transaction, the largest in the history of the district, was estimated

unofficially at approximately $10,000,000, although officials of both companies would reveal no monetary figures as to the consideration involved.

Properties of the Commerce Company involved include all mines, mills, mining leases and fees, mining and milling equipment and machinery, the company's large power plant located a mile west of Cardin, and the mine supply and warehouse at Cardin.

Announcement was made by an official of the Eagle-Picher Company that there will be no immediate changes of consequence in the management or operating arrangements of the Commerce Company. As scheduled, the properties, which were closed for the seasonal holidays, resumed operations on January 2. It was further announced that Commerce Company offices at Miami will be retained by Eagle-Picher.

Those negotiating the transfer included John A. Robinson, George L. Coleman, Jr., C. M. Harvey, Sr., and C. M. Harvey, Jr., on behalf of the Commerce Company; and A. E. Bendelari, Vincent Beckman, W. R. Dice, Carl A. Geist, and George W. Potter for the Eagle-Picher Company.

During the last 15 years the Commerce Company has produced and shipped more than 750,000 tons of zinc concentrates and approximately 125,000 tons of lead ore. A conservation estimate of the values of ores shipped by the company probably would exceed $50,000,000.

Mack Lake Leases California Mine

The Calmich Mining Company, controlled by Mack C. Lake, consulting geologist, 74 New Montgomery Street, San Francisco, Calif., have taken a lease on the Blue Point gravel mine, located near Smartville, Calif. Mr. James R. Elmendorf is superintendent in charge of operations. The officers of the company are Mack C. Lake, president and treasurer; Carlo S. Morbio, secretary.

The mine will be worked by underground drift methods. Double-drum slusher hoists and scrapers will be used. The cemented gravel will be disintegrated in a cylindrical mill and trommel. The gold occurring in the undersize material will be recovered in a Pan-American pulsator jig, supplemented with sluice-box riffles. The oversize tailings will be sluiced into a bin where they will be drawn into a dump truck for transportation to the dump pile.

Production is expected to equal about 100 tons of gravel per day.

Kanawha Valley Institute Elects Martin President

D. W. Martin, of Eskdale, general superintendent of the Wyatt Coal Company, was elected president of the Kanawha Valley Mining Institute at a meeting held at the New River State College, Montgomery, W. Va., January 13.

The program for the meeting was arranged by J. E. Chamness, general superintendent of the Truax Coal Company, and included motion pictures at various operations of the company.

Other officers named included: Roy Long, superintendent, No. 5 mine, Koppers Coal Company, vice president; W. F. Wolfe, superintendent, Kanawha & Hocking Coal & Coke Company, vice president; T. C. Miller, superintendent, Semet Solvay Company, Longacre, vice president; C. O. Morris, state department of mines, Charleston, secretary and treasurer.

Carel Robinson, consulting engineer, is the retiring president.

—BOOK REVIEWS—

Lake Superior Iron Ores. *A new handbook compiled and published in December* 1938 *by the Lake Superior Iron Ore Association,* 1170 *Hanna Bldg., Cleveland, Ohio.* 412 *pages.* $5.00.

Meeting the urgent need for a comprehensive statistical treatment in one volume of important available data on the location, development and product of every iron mine in the Lake Superior region, movement of ore to consuming districts and its utilization, this valuable work, begun by the late W. L. Tinker in 1936 as an outgrowth of a proposal by R. C. Allen, was largely completed by his successor, M. D. Harbaugh, who edited the work throughout.

Opening with an attractive and useful frontispiece in four colors showing the movement of Lake Superior iron ore and of eastern and imported iron ore from sources to consuming districts in 1937, the early chapters treat in popular tone with a minimum of technical language the following subjects: Discovery and early development of the iron ranges (by Carl Zapffe); geology of the iron ranges and influence of geological conditions on mining practice (by Stephen Royce); mineralogy; classification and sampling (by C. B. Murray); grading to cargo specifications (by E. P. Bayer); and preparation for market requirements, shipments and reduction (by Carl Zapffe and Earl E. Hunner).

Then follow directories of iron mining companies and mines, and tables and charts showing shipments, distribution and consumption of ore, analyses, reserves, taxes, prices, rail and lake carriers, freight rates, loading and unloading docks, blast furnaces, iron and steel production, ore production and imports of the United States, and world iron ore production. In short, there is little of importance omitted in the comprehensive statistical treatment.

The volume concludes with 12 double-page maps clearly showing the location and names of mining properties in all the ranges.

Arrangement of the directories, tables and maps is excellent, and choice of the size of the book (8½ in. x 11 in.) was decidedly advantageous in this connection. Painstaking work in editing the volume is evident throughout.

All those concerned with Lake Superior iron mining will find this an invaluable reference book.

Conclusions from Experiments in Grinding. *By Will H. Coghill and Fred D. DeVaney. Missouri School of Mines and Metallurgy, Bulletin, Vol.* 13, *No.* 1, *September* 1938. 102 *pages.*

Engineers of the U. S. Bureau of Mines, in cooperation with the School of Mines and Metallurgy of the University of Missouri, Rolla, have assembled in this useful book the results of years of study on the subject of grinding, in the field and laboratory, in easy style without burdensome tables or graphs.

After a brief outline of early and modern history of particle size reduction the authors pass at once into a detailed discussion of the ball mill, pointing out that there are some 650 ball, rod or pebble mills with about 100,000 connected horsepower in ore concentrators in the United States.

Other subjects dealt with in detail include the relation of surface and work, appraisal of particle size reduction, grinding in batch and open circuit, grinding in closed circuit, and use of coercimeter in grinding tests. Important points are summarized in a chapter on Cardinal Points of Grinding, and the volume ends with a valuable bibliography.

PERSONALS

LOUIS C. MADEIRA, III, executive director of the Anthracite Institute, announced December 30 that due to the resignation of JOHN B. SCOTT, Washington representative of the Anthracite Institute, who has so ably served the industry for many years, the Washington office of the Institute will be closed after February 1. Work formerly carried on by Mr. Scott will be handled from the New York office of the Institute.

RICHARD FAULL, mechanical engineer in the iron mines and quarry division of the Tennessee Coal, Iron and Railroad Company, Birmingham, Ala., has recently been retired. Mr. Faull has been called one of the two ablest pioneers in the mechanization of iron mining. He spent his earlier years at the Soudan mine on the Vermilion Range, Minnesota, transferring to the iron mining division of the T. C. I. in 1901. Last February Mr. Faull received a medal for 50 years' service to U. S. Steel, the sixth T. C. I. man to merit this honor.

ROBERT W. LEA has resigned as president of the West Virginia Coal and Coke Company to become vice president of the Johns-Manville Corporation. Mr. Lea will retain his directorship of the West Virginia Coal and Coke Company.

W. J. HEATHERMAN has been appointed superintendent of the Blackberry and B mines of the Riverview Coal Company, Coalburg, W. Va.

R. S. SADDLER is now superintendent of the Vera Nos. 1, 2, and 3 mines of the Vera Pocahontas Coal Company, Jaeger, W. Va.

LEWIS P. LARSON, president of the Pend Oreille Mines and Metals Company, has recovered from an appendicitis operation.

E. A. RICKARD, chief electrician for the Koppers Coal Company, presented a paper entitled "Repairs to Equipment" at the regular monthly meeting of the Big Sandy-Elkhorn Coal Mining Institute held at Pikeville, Ky., January 27.

JOHN IRA THOMAS has been appointed Secretary of Mines in the new cabinet of Governor Arthur H. James, of Pennsylvania. It has been reported that the appointment is temporary, and that Mr. Thomas may be succeeded later by a man thoroughly acquainted with the merchandising problems of the anthracite industry.

L. T. PUTMAN, general superintendent, Raleigh-Wyoming Mining Company, was reelected president of the Winding Gulf Operators Association at the annual meeting of the organization held December 19 in Beckley, W. Va.

J. F. MITCHELL-ROBERTS, export manager for Oliver United Filters, Inc., has just returned from a two-year trip which took him around the world. He covered practically every country in which the company has business interests—with the exception of those in Latin America, which he expects to visit a little later on.

C. V. HUNT is now superintendent of the Kingston Nos. 2, 4, and 9 mines of the Kingston Pocahontas Coal Company, Kingston, W. Va.

A. J. BOYLE has been appointed superintendent of the Jamison No. 9 mine, Jamison Coal and Coke Company, Farmington, W. Va.

WILLIAM C. HOOD has been appointed general superintendent of the H. C. Frick Coke Company, succeeding CLAY F. LYNCH, who recently resigned.

Mr. Hood has been employed by Frick and associated companies since 1897, and for the last year was general superintendent for the U. S. Coal and Coke Company.

W. L. OSBORNE has been appointed superintendent of the Empire mine of Vera Pocahontas Coal Company, at Landgraff, W. Va.

G. F. MASH has been named superintendent of the Arista and Hiawatha mines of the Weyanoke Coal and Coke Company, at Arista and Hiawatha, W. Va.

WILLIAM TUCKER is now superintendent of the Edna mine of the Edna Gas Coal Company, at Brady, W. Va.

NORTH C. SHAVER, vice president and general manager of the Penn Machine Company, has been elected chairman of the rail bond section of the National Electrical Manufacturing Association.

JOSEPH BECKER, vice president and a director of Koppers Company, has also been made president of Koppers-Rheolaveur Company, designers and builders of coal-washing plants. W. S. MCALEER, manager of Koppers-Rheolaveur, has been made a vice president and director of the company.

— *Obituaries* —

PHIL H. PENNA, a pioneer in the Indiana coal mining industry, died at his home in Terre Haute, Ind., January 7. During his active life in the coal industry he served for many years as secretary of the Indiana Bituminous Coal Operators Association.

ELMER MILLER, president of the Kenmont Coal Company, with operations in the Hazard Field, died recently at his home in Toledo, Ohio. Mr. Miller was a member of the organizing group of the Hazard Operators Association, and has been associated with the organization since its founding in 1916. He was a staunch supporter of all association activities throughout his long business career.

GEORGE E. COXE, prominent mining engineer and geologist, died recently at his home in Salt Lake City, Utah, at the age of 68. Coxe maintained professional offices in Salt Lake City, and was on the consulting staff of companies operating in Arizona, Idaho, Montana, Nevada, and Utah. He was also president of the Pioche-Kansas Mines, Inc., of Nevada.

CHARLES G. KOHLER, retired mining engineer and coal operator, died at his home in Bessemer, Ala., December 16, at the age of 71. He had been connected with a number of coal mining operations in the Birmingham district as a mining engineer for a long time, and conducted operations of his own as well.

GEORGE B. LYMAN, mine superintendent of the Copper Queen Branch, Phelps Dodge Corporation, Bisbee, Ariz., died December 7 at the age of 49.

Shortly after graduating from Stanford University in 1915, Mr. Lyman moved to Bisbee, where he entered the employ of the Copper Queen Branch as a sampler. In the years that followed he progressed step by step to the position of mine superintendent.

FREDERICK L. SCHOEW, prominent coal operator in the southern West Virginia fields, died of a heart ailment January 20 at Huntington, W. Va., at the age of 72.

JOHN P. GRAY, one of the nation's outstanding mining attorneys, died at his home in Coeur d'Alene, Idaho, January 6, at the age of 58.

During his brilliant career, Mr. Gray had figured prominently in the major mining suits of the past quarter of a century. For 37 years he was closely connected with the mining industry of the Coeur d'Alenes, serving as attorney for leading operators. He was regarded as an authority on mining law, and won notable decisions on questions of apex rights.

Registrant's Viewpoint

(*Continued from page 60*)

ing in the market" was the sale of stock in a free and then active market.

It will be seen, therefore, that the stop order was based (1) on the failure to disclose parentage, and (2) on the inference drawn from the letter that manipulation was in contemplation or had been committed. Both of these assumptions ignored the evidence produced at the hearing on these subjects. The stop order was removed upon the filing of further amendments to clear these two points; nevertheless, the precedents involved remain.

A stop order is punitive in its results. It not only prevents the sale of stock, but, more serious still, it may create a contingent liability to purchasers of stock, which, if enforceable, might easily lead to bankruptcy.

Suggestions Outlined

Based upon experience gained in this matter, I shall take the liberty of submitting certain suggestions for your consideration in the hope that you may pass them on to the Commission. I believe their adoption would go far towards smoothing the road yet to be traveled in the further administration of these congressional mandates; they may also, perhaps, help to bridge any remaining gaps between the Commission and future registrants.

1. I believe the Commission should establish a bureau to be freely available to registrants from which dependable and binding information can be obtained relating to each registrant's problems. So far as such a bureau is concerned with mining, it should also issue or adopt a glossary of mining terminology, and also clearly define any of its principles where they apply to commonly accepted engineering or mining practice.

2. In no instances should the Commission apply retroactively any of its conceptions or rules and regulations in a punitive manner, without first giving registrants an opportunity to conform with such new requirements.

3. That the Commission before bringing stop order proceedings, which in any event result in a grave injury to the registrant and especially to the reputations of honest and decent men associated with such an enterprise, should first exhaust its broad powers of preliminary investigation. If the registrant fails in good faith to aid the Commission in such an investigation, and if it should produce definite evidence of serious wrong doing, then, obviously, no one can question the Commission's right and duty to enforce the law. The Commission should at all times be most jealous of its reputation for fairness.

4. Rules and regulations should also be issued as soon as possible governing permissible market stabilization practices during the distribution period. It is most difficult in these days to obtain public support for new ventures unless public markets are created at the inception of such undertakings.

My object in coming here is not to complain, but to do what little I can to bring about a more harmonious working of the Securities Acts where they come in contact with possible registrants. I appreciate fully the many added burdens and responsibilities which Congress has imposed on the Commission, and that it is trying to the utmost of its ability to work out the many-sided problems in a spirit of what is best for the good of the country. I don't want to add to these burdens. If any of my remarks may help the Commission's task in creating a better feeling all around, then I will feel that this long but pleasant trip will have been worth while.

PUBLICATIONS of INTEREST

U. S. BUREAU OF MINES

Bull. 411. CARBONIZING PROPERTIES OF WEST VIRGINIA COALS AND BLENDS OF COALS FROM THE ALMA, CEDAR GROVE, DOROTHY, POWELLTON A, EAGLE, POCAHONTAS, AND BECKLEY BEDS, by A. C. Fieldner, J. D. Davis, W. A. Selvig, R. Thiessen, D. A. Reynolds, C. R. Holmes, and G. C. Sprunk. 162 pp. 129 figs. 30 cents.

Bull. 415. STUDIES OF CERTAIN PROPERTIES OF OIL SHALE AND SHALE OIL, by Boyd Guthrie. 159 pp. 29 figs. 25 cents.

Bull. 416. QUARRY ACCIDENTS IN THE UNITED STATES DURING THE CALENDAR YEAR 1936, by Wm. W. Adams and Virginia F. Wrenn. 71 pp. 3 figs. 15 cents.

T. P. 591. FEDERAL PLACER - MINING LAWS AND REGULATIONS, by Fred W. Johnson, and SMALL - SCALE PLACER-MINING METHODS, by Chas. F. Jackson. 49 pp. 26 figs. 10 cents.

Miners' Circular 37. SAFETY EDUCATION IN SCHOOLS OF MINING DISTRICTS, by F. S. Crawford, A. U. Miller, and C. W. Owings. 34 pp. 1 fig. 10 cents.

R. I. 3424. THE AGGLOMERATING INDEX OF COAL, by J. F. Barkley and L. R. Burdick. 8 pp.

R. I. 3427. ANNUAL REPORT OF THE NONMETALS DIVISION, FISCAL YEAR 1938, by Oliver Ralston and others. 38 pp. 4 figs.

I. C. 7039. GOLD MINING AND MILLING IN IDAHO COUNTY, IDAHO, by S. H. Lorain. 90 pp. 24 figs.

I. C. 7040. COAL - MINE EXPLOSIVES: THEIR CHARACTERISTICS, SELECTION, AND SAFE USE, by J. E. Tiffany. 20 pp. 2 figs.

I. C. 7041. FORWARDING HEALTH AND SAFETY IN COAL MINING BY USE OF WATERING METHODS, by D. Harrington and J. J. Forbes. 11 pp. 7 figs.

Foreign Minerals Quarterly, January, 1939. MINERAL PRODUCTION AND TRADE OF DENMARK, FINLAND, NORWAY AND SWEDEN. 74 pp.

U. S. GEOLOGICAL SURVEY

P. P. 188. THE SAN JUAN COUNTRY—A GEOGRAPHIC AND GEOLOGIC RECONNAISSANCE OF SOUTHEASTERN UTAH, by Herbert E. Gregory, with contributions by Malcolm R. Thorpe. 123 pp., 26 plates, 4 figs. 60 cents.

Bull. 896. LEXICON OF GEOLOGIC NAMES OF THE UNITED STATES (INCLUDING ALASKA), compiled by M. Grace Wilmarth. Definitions of the more than 10,000 named stratigraphic units of the United States and Alaska, scattered throughout the geologic literature of the past hundred years, summarized and brought together in one publication which is issued in two volumes. 2,396 pp. $2.50.

Bull. 902. THE BROWN IRON ORES OF EASTERN TEXAS, by Edwin B. Eckel. 157 pp. 20 plates. 6 figs. $1.00.

Bull. 904. GEOLOGY OF THE SLANA-TOK DISTRICT, ALASKA, by Fred H. Moffit. 54 pp. 4 plates. 4 figs. 35 cents.

Water-Supply Paper 837. INVENTORY OF UNPUBLISHED HYDROLOGIC DATA, by William T. Holland and Clarence S. Jarvis. 77 pp. 15 cents.

MISCELLANEOUS

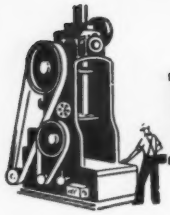
EXPERIMENTS ON TOXICITY, LEACHING, AND FIRE-RETARDING EFFECTIVENESS OF WOLMAN SALTS, by R. H. Baechler. U. S. Forest Products Laboratory, Madison, Wis. Mimeograph R1180.

TESTING WOOD PRESERVATIVES. U. S. Forest Products Laboratory, Madison, Wis. Mimeograph R1190.

WOOD PRESERVATIVES. U. S. Forest Products Laboratory, Madison, Wis. Mimeograph R149.

THE CONSTRUCTION INDUSTRY — THE OUTLOOK FOR 1939. Tri-Continental Corporation, 54 Wall Street, New York. 40 pp.

AMERICAN STANDARD SAFETY CODE FOR THE PROTECTION OF HEADS, EYES, AND RESPIRATORY ORGANS. U. S. Department of Commerce, National Bureau of Standards Handbook H24. 95 pp. 15 cents.



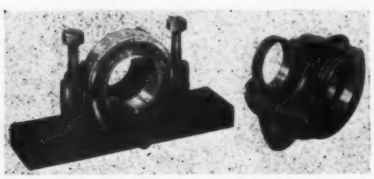
MANUFACTURERS' Forum

Triple Seal for Bearings

A patented triple seal which effectively protects the bearing against lubricant leakage, dust, dirt, and moisture has been made available by SKF Industries, Inc., Front Street and Erie Avenue, Philadelphia.

This seal consists of two split piston rings on each side of the housing and grooved on the outside diameter to form a labyrinth seal with the two end bores of the housing. Each ring has an inward tension that enables it to turn with the shaft.

On either side of the housing, two rings are mounted on the shaft with the splits 180 degrees apart to prevent lubricant leakage through the splits. The inner ring serves as an internal



flinger, and the outer ring keeps dirt and other foreign substance from entering the housing.

The triple seal is made for the complete range of standard shaft sizes, and is designed for split housings which are machined to allow axial freedom of the bearing. These housings are sturdy and designed to accommodate various shaft diameters which are necessary to compensate for the various types of bearings having the same outside diameter.

Intermediate Size Strain Clamp

To accommodate the middle range of conductor sizes, those ranging in diameter from 3/16 to 7/16 inch, the Ohio Brass Company, Mansfield, Ohio, has brought out an Intermediate Universal Strain Clamp. It provides an economical clamp for cables which are too large for the Baby Universal Clamp and for which the regular Universal Clamp is unnecessarily large. Having a reversible keeper piece it will take any standard conductors from 8A to 2A Copperweld, from No. 4 to 3/0 solid copper, from No. 5 to 2/0 stranded copper, and from No. 6 to No. 2 A.C.S.R. It is particularly adapted for use with high-strength No. 2 and No. 4 A.C.S.R. having one steel strand and seven aluminum strands. The rated ultimate strength of the clamp is 10,000 pounds.

The Intermediate Universal Strain Clamp weighs slightly more than 2 pounds, and therefore causes no harmful conductor vibration. Though light in weight and comparatively small, its body strength allows a liberal factor of safety for any conductors. Most of the holding power is provided by the snubbing action inherent in the helical shape of the clamp. A modified V groove has a wedging action on the cable which increases the frictional grip between the cable and clamp seat.

Voltage Transformers

Designed for use with portable instruments and recorders, the Westinghouse PV-130 portable voltage transformers may be advantageously used on all portable and laboratory applications in delta connection except for standards.

An accuracy of within ±¼ percent on ratio and 20 minutes on phase angle is provided under ordinary conditions of load and power factor. When used with special test data the ratio may be corrected to within 1/10 of 1 percent and the phase angle to within 3 minutes.

Designed for 115 volts secondary these transformers are available in two sizes. The small size for primary voltages up to 2,300 volts weighs 24 pounds and measures 5¾ inches x 7 1/16 inches x 7¼ inches. The large size for primary voltages from 2,300 to 6,900 volts weighs 48 pounds and measures 7¾ inches x 9 3/16 inches x 9⅛ inches.

Shell type construction is used. The terminals are mounted on clearly marked moldarta terminal block which forms the top panel on the transformer. Primary and secondary terminals are made of bare polished nickel thus avoiding any assumption concerning insulation of these terminals.

Left: Holding Skid

Below: Running Skid

Car Spotting Devices

In an effort to minimize mine haulage accidents, the Portable Lamp and Equipment Co., 77 First Avenue, Pittsburgh, Pa., has developed two new devices for spotting cars with safety and controlling trips on long, steep grades.

The holding skid, herewith illustrated, is made of highest grade malleable iron and fits all standard mine rails. It is particularly valuable for spotting loaded and empty cars at the face.

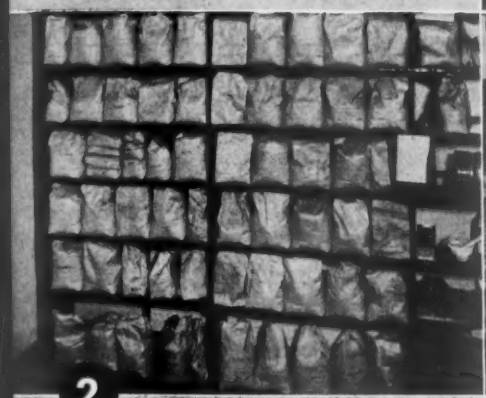
The running skid, also illustrated, consists of a shoe and half soles of special alloy metal, in rights and lefts, inexpensively replaced. One size fits all standard mine rails.

The manufacturer will be pleased to furnish literature and prices upon request.

1939 will be a great year for mining companies everywhere . . . Now is the time to plan for development or expansion!

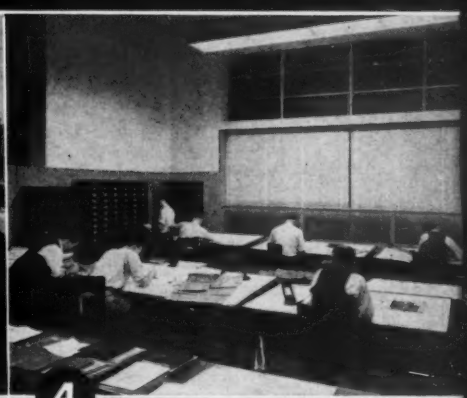
1 Denver Equipment Co. opens the doors of the new general offices, ready to serve you with its complete facilities

Hundreds of profitable milling plants have been installed on the basis of Denver Equipment Co. test reports, tests are reliable and inexpensive.



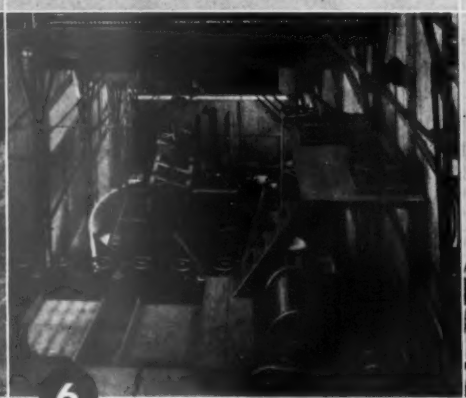
2 From every mining district in the world come ores to be tested as shown by the assortment of samples above

3 Batch tests determine the correct treatment . . . a continuous test plant is also available for large ore shipments



4 After laboratory results have been correlated, mill requirements and equipment are accurately determined

5 When mill is erected, our engineers with years of practical operating experience. . . will work with your staff



6 Successful mills everywhere are using Denver Equipment . . . this is your guarantee of "24-Hour Service per Day"

7 Before building a mill or buying equipment, contact nearest office . . . A field engineer is available at your request

NEW YORK CITY, NEW YORK: 50 Church Street
SALT LAKE CITY, UTAH: McIntyre Building
TORONTO, ONTARIO: 45 Richmond Street West
LONDON, ENGLAND: 840 Salisbury Hse., E.C. 2

DENVER EQUIPMENT 24 HOUR SERVICE COMPANY

MEXICO, D. F.: Boker Bldg., 16 de Septiembre, 58
SANTIAGO, CHILE: Clasificador F-485
MELBOURNE, AUSTRALIA: 360 Collins Street
JOHANNESBURG, SO. AFRICA: Bon Accord Hse.

DENVER EQUIPMENT COMPANY

1400 SEVENTEENTH STREET, DENVER, COLORADO

Air-Cooled Mine Locomotive Headlight

The Mosebach Electric and Supply Co., 1152 Arlington Avenue, Pittsburgh, Pa., announces a new mine locomotive headlight which is air-cooled for greater efficiency.

The air-cooling feature of this new headlight dissipates all heat generated in ordinary headlights—protects insulation, wire and bulb sockets. Cooling air enters through a vent in

the top and circulates over and behind the reflector, discharging through the bottom.

A 94-watt bulb is used. Bulb socket is insulated in a spring cradle to prevent jarring. The reflector is of bronze, silver plated for stronger and brighter illumination and to eliminate frequent replacement due to damage.

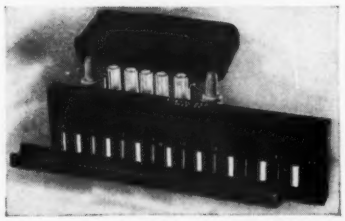
The manufacturer will be pleased to furnish complete information and prices on request.

Slide Comparator

A new Slide Comparator for the colorimetric determination of pH, chlorine and phosphates has been developed by W. A. Taylor & Co., 872 Linden Ave., Baltimore, Md.

The new outfit is molded entirely from plastic. Radical changes in design have resulted in marked improvement in appearance, durability and ease of handling. The weight has also been considerably reduced. All pH, chlorine and phosphate values, as well as the indicator names, are engraved in white directly on the plastic slides. Improved catches are used to hold the top on the base and all metal parts are rustproof. The whole outfit, including the slide is 10 inches long, 2⅛ inches wide and 4 inches high and weighs only 1½ pounds.

The new Comparator consists of a slide and a base. Each slide contains



9 color standards alternating with ampoules of distilled water. All color standards are guaranteed by the manufacturer to maintain their accuracy for a period of five years. The base contains two vials of indicator solution, with 0.5 cc. pipettes and 5-5 cc. test tubes, and a piece of etched glass in a special compartment. Full information on these outfits can be obtained from the manufacturer.

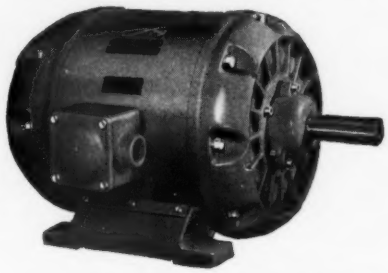
Streamlined Motor Safety

A brand new line of both alternating- and direct-current explosion-proof motors that they state makes possible a new high in electric motor dependability, convenience, long life, and safety has been announced by The Louis Allis Co. of Milwaukee, Wis.

This new, modern, streamlined motor was designed in collaboration with one of the leading industrial stylists in the United States, and is the last word in modern industrial streamlining.

Eighteen separate and distinct major mechanical and electrical improvements, several of which are exclusive patented features, are incorporated in this new line of explosion-proof electric motors.

The company has prepared a very

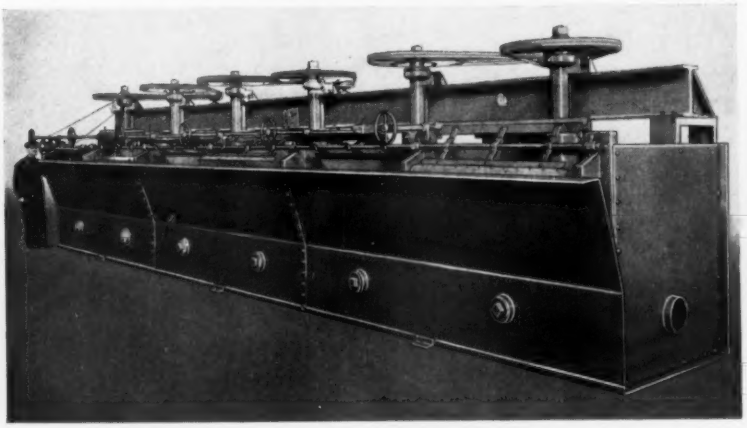


complete booklet (No. 508E) illustrating and describing in detail the many advantageous features of this new motor, a copy of which will be sent upon your request.

Tube Cutting Machine

At least five new time-saving and money-saving features improve the No. 213 Campbell cutting machine which is designed for smooth, accu-

World's Largest Mechanical Flotation Machine



No application is too large, too difficult, or too complex for this No. 30 Denver "Sub-A" (Fahrenwald) flotation machine, according to the manufacturer—Denver Equipment Co. This size machine had its initial application and finds a ready use in coal flotation where tonnages are very high. The No. 30 handles up to 3,000 tons per 24 hours. Advantages of Denver "Sub-A" features embodying low horsepower, molded rubber parts, middling returns by gravity and high metallurgical efficiency are included in this large unit

rate, high quality cuts on tubing up to and including 3½ inches or solids up to and including 2 inches.

Various improvements included in the new machine comprise: A new cooling system which keeps the wheel perfectly cool for more smooth accurate cuts; a precise micrometer stop bar for quick micrometer adjustments; a new type bar holder and clamps for long or short stock; and a new moisture and dust-proof spindle closure.

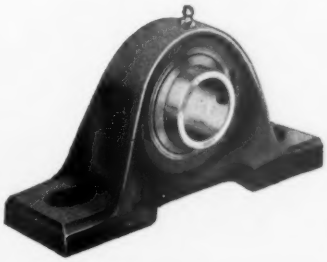
An informative folder called "Design for Cutting Costs" will be sent by writing to the Andrew C. Campbell Division, American Chain & Cable Company, Inc., Bridgeport, Conn.

Ball Bearing Pillow Blocks

A complete new type of ball-bearing pillow blocks has been developed under the trade name Sealmaster, by Stephens-Adamson Mfg. Co., Aurora, Ill.

Outstanding feature of this new line is the permanent seal principle of the bearing, a positive, centrifugal sealing principle consisting of two inner and two outer steel seals. Inner seals, one at each side of bearing, are pressed into outer ring and become permanent part of bearing, forming tight grease chamber for race grooves and rolling elements.

External flinger seals are pressed into position upon land of inner race ring. External seals are lined with felt applied with cellulose cement.



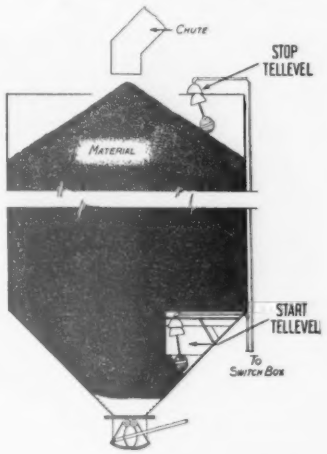
Felt liners of external seals travel in labyrinth angular grooves of inner seals. When assembled into the labyrinth groove, felts have a running clearance sufficient to prevent pressure.

Centrifugal action of dished felt rings rotating in grooved labyrinth inner seals prevents glazing and excludes all foreign materials.

Even though bearing is removed from shaft, the permanent seal feature prevents ingress of dirt, because the bearing is sealed within itself.

Catalogue No. 7538 describing this will be sent upon request.

Stephens-Adamson has also announced the new Tellevel automatic storage control, an extremely sensi-



tive, inexpensive device, with no wearing parts, which will control automatically the level of any material in bins or hoppers.

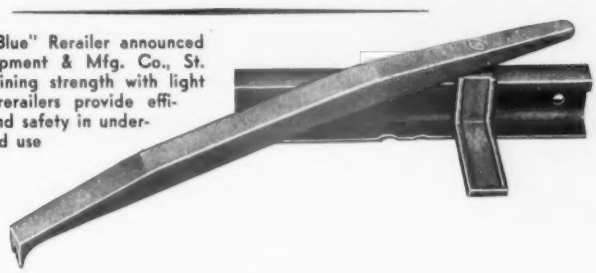
Control of level of material in bins is accomplished by the operation of the device in starting or stopping the conveyors or elevators feeding the bin. Operation is normally entirely automatic, but by a simple change in wiring the Tellevel can be made to keep the flow of material stopped or continuous until the control switch is thrown.

Advance Bulletin 238 will be sent upon request.

Starter for Single-Phase Motors

A new magnetic switch has been announced by General Electric's Industrial Department, Schenectady, N. Y., for use with single-phase motors. The new device, which is available in ratings of 3 hp. at 110 volts, 5 hp. at 220 volts, and 7½ hp. at 440 volts, consists of a standard general-purpose 4-pole magnetic switch with two poles connected in parallel. This arrangement makes the device equivalent to a 2-pole switch with one overload relay. Its application is limited to use with single-phase motors whose normal full-load current does not exceed 30 amperes.

New "Gemco Tru-Blue" Rerailer announced by Gibraltar Equipment & Mfg. Co., St. Louis, Mo. Combining strength with light weight, the new rerailers provide efficiency, economy and safety in underground use



CATALOGS AND BULLETINS

• Cable Joints. *General Electric Co.*, Schenectady, N. Y. Bulletin GEA-2989 gives detailed instructions for splicing and vulcanizing all the principal types of rubber-insulated rubber-jacketed portable cable. 16 pages.

• Car Pullers, Hoists and Winches. *Stephens-Adamson Mfg. Co.*, Aurora, Ill. Catalog 7738 gives specifications, dimensions and required engineering information on how to select proper car pullers. 8 pages.

• Chain Drives *Link-Belt Co.*, 307 N. Michigan Ave., Chicago, Ill. Data Book 1645 presents company's Silverstreak silent chain and Silverlink roller chain drives for automotive and stationary engines (timing and accessory driving). Contains useful data for designing drives for gasoline, oil, Diesel and steam engines, and in laying out convenient, efficient, durable and quiet driving connections between crankshafts, camshafts, fanshafts, generators, magnetos, compressors, blowers, governors, etc. 48 pages.

• Coal Drying Equipment. *Link-Belt Co.*, 307 N. Michigan Ave., Chicago, Ill. Book 1711 describes company's Roto-Louvre Dryer, discussing the economical solution of materials drying or cooling problems through the use of this machine. Coal and ore are excluded in the long list of materials that the dryer will handle efficiently. 16 pages.

• Compressors. *Sullivan Machinery Co.*, Michigan City, Ind. Bulletin A-18 describes the company's line of advanced design air and gas compressors known as the Class WN-112. 16 pages.

• Mining Equipment. *Allis-Chalmers Mfg. Co.*, Milwaukee, Wis. Bulletin 161 presents a general description of the company's equipment for metallic, nonmetallic and associated industries. Besides reporting, with liberal illustrations, latest developments in all types of production machinery applying to process in the mining industries, it includes information on blowers and compressors, electrical, power, pumping, transmission and other related equipment. 96 pages.

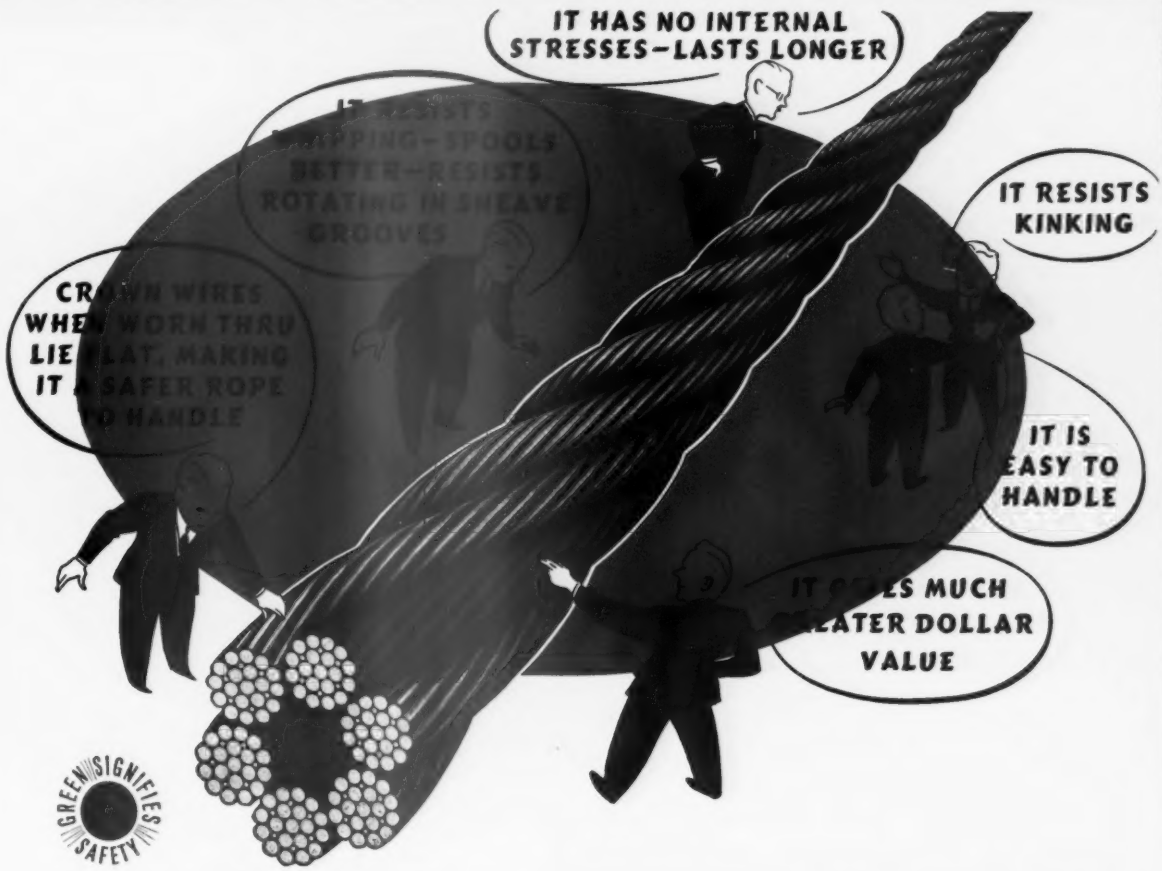
• Motor Application Chart. *The Louis Allis Co.*, Milwaukee, Wis. Bulletin 515 lists 26 different types of motors and checks the proper type of motor recommended for about 50 standard applications. 4 pages.

• Motor Standards. *The Louis Allis Co.*, Milwaukee, Wis. Bulletin 610 presents condensed information on NEMA Standards and Definitions of electric motors, including suggestions for the proper selection of motors, types of drives, various types of protected motors, etc. 8 pages.

• Speed Reducers. *Allis-Chalmers Mfg. Co.*, Milwaukee, Wis. Leaflet 2203-B describes the company's compact self-contained gearmotor speed reducers for efficient low-speed operation, including a table of ratings and speeds with 1,750 r. p. m. motors. 4 pages.

• Trolley Line Material. *Westinghouse Elec. & Mfg. Co.*, E. Pittsburgh, Pa. Catalog Section 74-000 outlines the company's complete line of trolley material, devoting one of six divisions to trolley line material for mines and industrial plants.

INDEX TO ADVERTISERS



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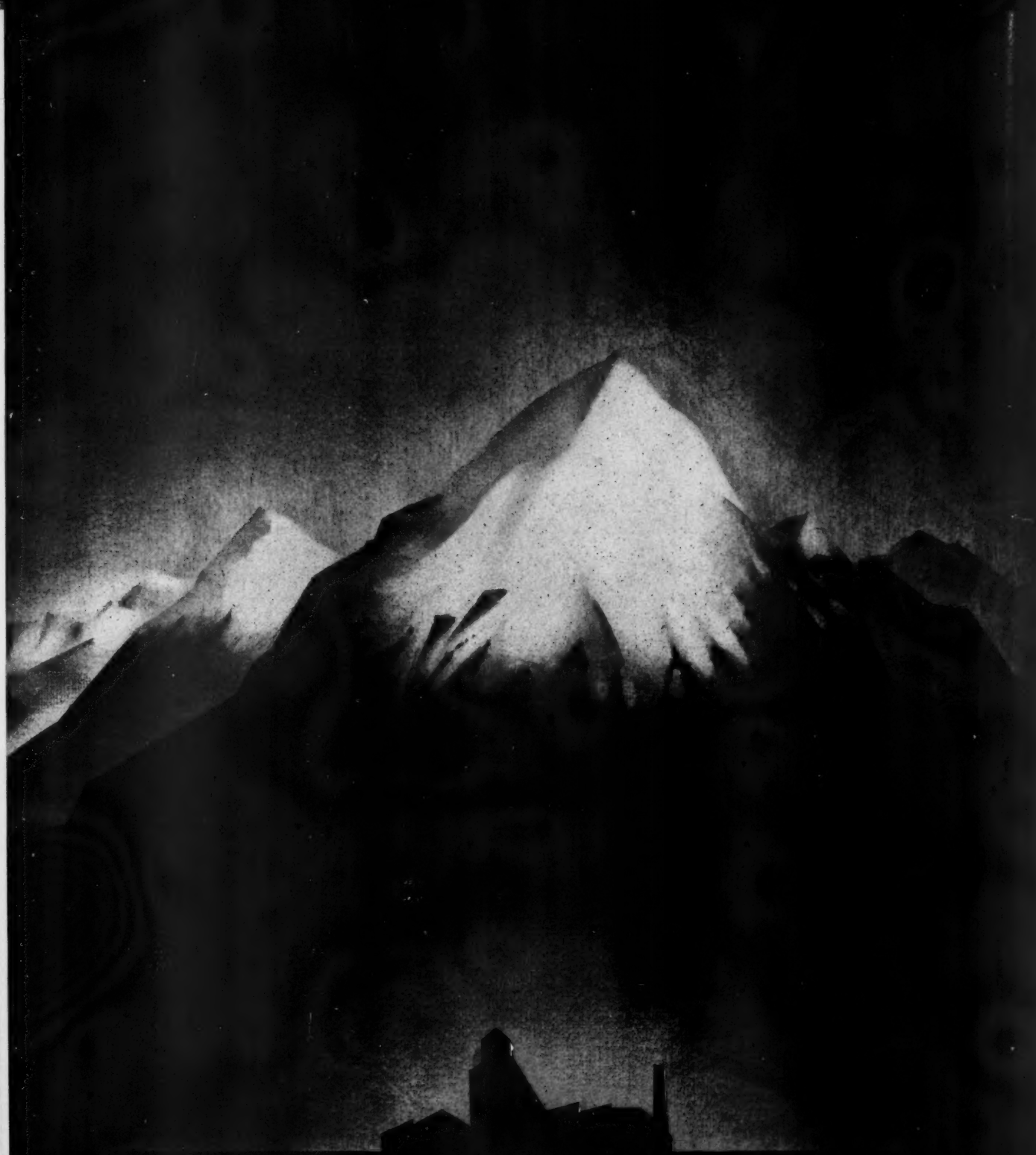

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